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RECORD OF DECISION

MARTHA C. ROSE CHEMICALS SITE

MARCH 1992

RECORD OF DECISION
DECLARATION

SITE NAME AND LOCATION

Martha C. Rose Chemicals, Inc.
Holden, Missouri

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Martha C. Rose Chemicals, Inc. site in Holden, Missouri, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the administrative record for this site.

MDNR feels residential use should be prohibited at the site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances at and from this site, if not addressed by implementation of the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This final remedy addresses remediation of soil, sediment, and buildings and structures contaminated by PCBs. This action addresses the principal threats remaining at the site by treating the most highly contaminated soils and debris. Treatment residuals and other contaminated soil and debris will be disposed of offsite. Other than ground water monitoring for a minimum of ten years, the site will not require any long-term management.

The major components of the selected remedy include:

- Excavation and offsite disposal of an estimated 826 cubic yards of PCB contaminated sediments above 0.18 ppm PCBs from an unnamed tributary of East Pin Oak Creek and East Pin Oak Creek.

- Excavation and offsite disposal or treatment of an estimated 4788 cubic yards of soil contaminated above 10 ppm PCBs.

- Dismantling of the Main Building and South Warehouse, including floor slabs and insulation, and the offsite disposal or treatment of the debris.

- Backfilling all excavated areas with clean soil.

- Ground water monitoring for a minimum 10-year period.

- Deed restrictions prohibiting the installation of ground water wells for purposes other than monitoring.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy may result in hazardous substances above health-based levels remaining onsite, the five-year review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment.

Morris Kay
Regional Administrator
EPA, Region VII

3-6-92
Date

RECORD OF DECISION

DECISION SUMMARY

MARTHA C. ROSE CHEMICALS SITE

March 1992

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RECORD OF DECISION

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Martha C. Rose Chemicals, Inc. (Rose) site is located at 500 West McKissock Street, immediately north of Missouri Highway 58, in Holden, Missouri as shown on Figure 1. Holden is approximately 50 miles southeast of Kansas City, Missouri. The Rose facility (approximately 11 acres) contains two major buildings, the Main Building and the South Warehouse. It also contains a small shed, a spill containment pond, and three storm water retention ponds. An intermittent unnamed tributary to East Pin Oak Creek flows through the southwest corner of the facility. Figure 2 presents the Rose site layout.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

The property upon which the Rose facility sets is owned by the City of Holden and was previously known as the Holden Industrial Park. The South Warehouse was built in the late 1940s, and is believed to have initially been used as a shop by International Harvester. The Main Building was constructed in stages during the 1960s. Royal Industries, Inc. (Royal) was the first company to lease a portion of the facility, having entered into a lease with the City of Holden for the Main Building on June 1, 1976. In early 1977, Lear Siegler, Inc. (Lear) acquired the stock of Royal and in June 1977, Royal was merged into Lear with the result that Lear succeeded to Royal's interest under the lease. A farm implement assembly and painting business operated at the site until early 1980. In December 1979, Lear entered into a sublease with W.C. Carolan Company, Inc. (Carolan) and assigned Lear's option to purchase the facility property to Carolan. The principal owner of Carolan, Walter Carolan, brought in a second company that he owned, American Steel Works, and subsequently leased a portion of the facility to a separate company, PCB Eliminators.

PCB Eliminators operated as a PCB-transfer facility and was in business for approximately one year, 1981. This facility picked up PCB materials from various entities, such as municipalities, rural electric coops, and businesses, consolidated the PCB materials and shipped them to other disposers. In 1982, PCB Eliminators ceased operation at the site. Simultaneously, Walter C. Carolan initiated his own company, Martha C. Rose Chemicals, Inc. (Rose) and began processing polychlorinated biphenyls (PCBs) and PCB capacitors and transformers. So far as has been determined, there was no written sublease or assignment between

Carolan and Rose. Carolan was one of several companies operating at the site under the same ownership, primarily that of Walter C. Carolan. The companies included: Dust Suppression, Inc.; American Steel Works, Inc.; W. C. Carolan Company, Inc.; and Martha C. Rose Chemicals, Inc.

Rose operated at the site from 1982 to February 1986. Rose operated under three approvals granted by the United States Environmental Protection Agency (EPA) under the PCB regulations, 40 C.F.R. Part 761, promulgated pursuant to the Toxic Substances Control Act (TSCA), to decontaminate mineral oil dielectric fluids containing PCBs at concentrations equal to or less than 10,000 parts per million (ppm) and to process PCB transformers and capacitors for disposal. Under the approvals, Rose was required to drain and flush the transformers and capacitors, disassemble the carcasses and then clean the salvageable metals before recycling. Capacitor cores were bagged and stored for disposal. A sodium reduction process was used by Rose to detoxify the PCB-contaminated oil.

During the four years Rose was in operation, it received approximately 23 million pounds of PCB materials from entities whose PCB materials were sent to the Rose facility for treatment or disposal. Rose ceased operations in February 1986, abandoning approximately 14 million pounds of PCB materials at the site.

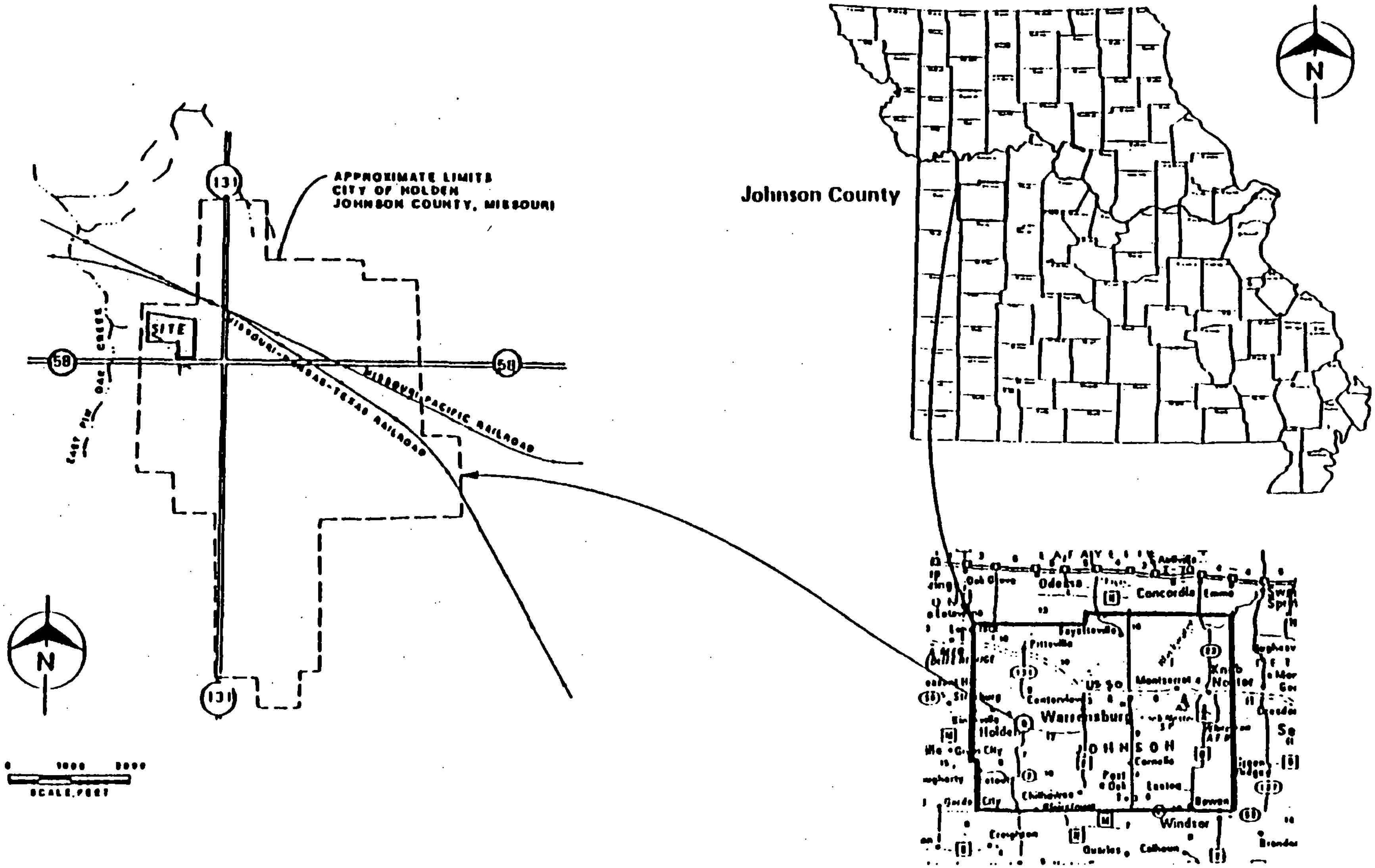
2.2 ENFORCEMENT HISTORY

Prior to the abandonment of the site in February 1986, several inspections of the Rose facility were conducted by EPA Region VII personnel and others to determine compliance with 40 C.F.R. Part 761 and other laws.

A January 1982 pre-operation inspection of the facility indicated no violations. At the time, few PCB items were stored onsite.

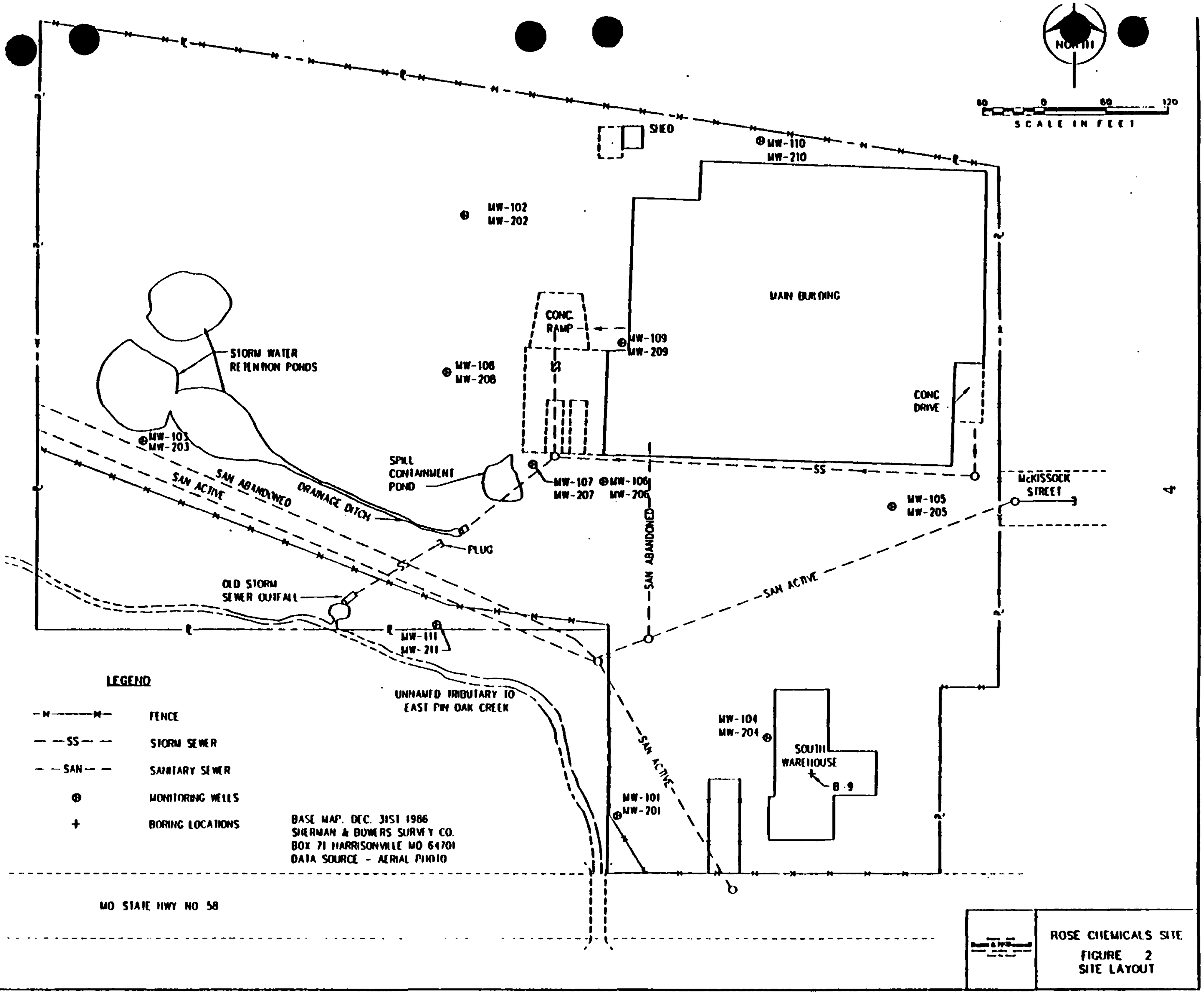
A November 1983 inspection and a review of documents requested from the facility identified violations of 40 C.F.R. Part 761, including unmarked PCB items and containers stored for more than one year. As a result, EPA issued an administrative complaint with a proposed civil penalty to Rose for the violations detected during this inspection. A subsequent Consent Agreement, dated July 2, 1984, required the owner to bring the facility into compliance by August 1, 1984 and to pay a civil penalty of $30,000. However, an August 1984 inspection revealed Rose had failed to comply with the terms of this Consent Agreement and also revealed the following new violations:

(1) Non-compliance with the terms of the capacitor processing approval.
(2) Non-compliance with the terms of the transformer processing approval.



Burns & McDonnell

ROSE CHEMICALS SITE
Figure I
SITE LOCATION
(LOCUS MAP)


NORTH
80 0 60 120
SCALE IN FEET
SHED
MW-110
MW-210
MW-102
MW-202
MAIN BUILDING
CONC RAMP
MW-109
MW-209
STORM WATER
RETENTION PONDS
MW-108
MW-208
CONC
DRIVE
MW-103
MW-203
SPILL
CONTAINMENT
POND
MW-107
MW-207
MW-106
MW-206
SS
McKISSOCK
STREET
MW-105
MW-205
SAN ABANDONED
SAN ACTIVE
DRAINAGE DITCH
PLUG
SAN ABANDONED
SAN ACTIVE
OLD STORM
SEWER OUTFALL
MW-111
MW-211
LEGEND
FENCE
STORM SEWER
SANITARY SEWER
MONITORING WELLS
BORING LOCATIONS
UNNAMED TRIBUTARY TO
EAST PIN OAK CREEK
MW-104
MW-204
SOUTH
WAREHOUSE
B-9
SAN ACTIVE
MW-101
MW-201
BASE MAP. DEC. 31ST 1986
SHERMAN & BOWERS SURVEY CO.
BOX 71 HARRISONVILLE MO 64701
DATA SOURCE - AERIAL PHOTO
MO STATE HWY NO 58
ROSE CHEMICALS SITE
FIGURE 2
SITE LAYOUT

(3) Non-compliance with the terms of the oil processing approval.
(4) Storage of PCBs and PCB items for more than one year.
(5) Improper disposal of PCB items.
(6) Improper records of the PCB items at the facility.
(7) Three improperly marked PCB transformers.
(8) Improper storage of PCBs resulting in spills inside the storage area.
(9) Improper containment of PCBs.

On July 21, 1985, the Occupational Safety and Health Administration (OSHA) inspected Rose and issued an order assessing a fine and requiring improvement in their worker protection program.

As a result of the nine violations detected during EPA's August 1984 inspection, a second Consent Agreement was signed on September 27, 1985 following the issuance of a second administrative complaint, requiring Rose to: (1) resubmit applications for approval of all three processes (capacitor, transformer, and oil processing) by January 27, 1986; (2) implement an inventory control system by approximately April 25, 1986; (3) pay a civil penalty; and (4) come into compliance with the PCB regulations at 40 C.F.R. Part 761.

An inspection of the Rose facility on December 19, 1985 documented numerous instances of violation of the PCB [illegible]lations including improper PCB storage. [illegible]lations [illegible]nment [illegible] wooden crates, a [illegible] paper sacks, and in transformers whose tops had been cut off with a torch. PCB items stored for more than one year were also documented. The curbing in Rose's containment area was also cracked.

On January 7, 1986, the Rose facility was reinspected. The inspection report noted that some of the damaged containment curbing had been repaired. However, PCBs had not been properly containerized since the last inspection, and the material stored for more than one year was still onsite. Some undated PCB items and items without proper labeling were also discovered.

On February 13, 1986, Rose was notified by EPA that the capacitor, transformer, and oil processing approvals would be revoked unless Rose complied with the two Consent Agreements by March 15, 1986. In late February 1986, Rose ceased operations and abandoned the site.

On May 16, 1986, a release of PCB liquid occurred at the Rose site. The total contents, approximately 200 gallons of PCB liquid, leaked from a tanker trailer which had been parked at the site since its abandonment in February 1986. The liquids flowed into an onsite holding pond and subsequently into the unnamed tributary which flows into East Pin Oak Creek. EPA responded to stabilize the site by increasing site security, removing a number of drums containing potentially explosive elemental sodium and 1,1,1-trichloroethane, and containing the free-flowing spilled PCB liquid.

On May 23, 1986, EPA issued a unilateral Administrative Order under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requiring Walter C. Carolan and his related companies to develop and implement a plan for the clean up of the site. Walter Carolan and his companies refused to comply with this CERCLA Section 106 Order.

Following receipt of notice from Rose that the company was ceasing operation, several of the generators who sent PCB wastes to Rose joined together and formed the Rose Chemicals Steering Committee (RCSC) in the spring of 1986 for the purpose of pursuing response actions at the site. In October 1986, EPA began notifying the approximately 800 potentially responsible parties (PRPs) of the problems existing at the Rose site and invited them to voluntarily undertake and/or participate in response actions at the Rose site.

The RCSC has entered into two Administrative Orders on Consent (AOCs) with EPA Region VII under the authority of Section 106(a) of CERCLA. Pursuant to the first AOC, effective November 12, 1986, the RCSC undertook response actions to secure and stabilize the Rose site. These initial response actions included: constructing a security fence surrounding the site; providing 24-hour security guard services; securing reactive chemicals onsite; draining and containerizing the liquids in several open pits; collecting miscellaneous drums and debris that were scattered around the site; inventorying and inspecting all bulk storage tanks; initiating preliminary onsite surface soil, sludge, and air sampling; and beginning the removal of bulk liquids (PCB oil in tanks).

The second AOC went into effect beginning October 29, 1987. This second AOC required the PRPs to: initiate a removal of PRP-sent material, continue certain activities initiated under the first AOC, and perform a Remedial Investigation/ Feasibility Study (RI/FS).

2.3 REMOVAL HISTORY

Under the first AOC, a partial removal of bulk liquids (PCB oil in tanks) from the site began in July 1987, and continued through December 1987. During this first removal effort, approximately 165,000 gallons (1.3 million pounds) of liquids were removed and incinerated at Pyrochem (APTUS) in Coffeyville, Kansas. Pursuant to the first AOC, the RCSC performed an inventory of the abandoned PCB materials. The second part of the removal effort was performed under the second AOC from March 1988 to October 1988. Approximately 16 million pounds of liquid PCBs, PCB equipment and PCB debris, as well as 3.6 million pounds of PCB-contaminated soil were removed from the Rose site. The following is a breakdown of the types and approximate amounts of materials disposed of during the two removals:

- Incinerated material - 11.1 million pounds total.
  - PCB-contaminated liquid - 6.2 million pounds.
  - Capacitors and capacitor parts - 4.5 million pounds.
  - Other combustible material - 0.4 million pounds.

- Landfilled material - 10.0 million pounds.
  - Bulk and containerized combustible and non-combustible debris - 4.5 million pounds.
  - Transformers - 1.9 million pounds.
  - Contaminated soil - 3.6 million pounds.

The majority of the incinerated material was treated at the Rollins Environmental Services incinerator in Deer Park, Texas. Materials not requiring treatment were landfilled at the Chemical Waste Management landfill in Emelle, Alabama in accordance with the PCB regulations at 40 C.F.R. Part 761.

A total of 21.1 million pounds of PCB-contaminated materials were removed from the Rose site during the combined removal efforts. A total of 11.1 million pounds (53 percent) of the PCB-contaminated materials were incinerated.

3.0 COMMUNITY PARTICIPATION ACTIVITIES

The RI/FS Reports were presented and outlined at the Holden city offices on June 19, 1991. The Proposed Plan for the Rose site was released to the public for comment on June 20, 1991. The RI/FS Reports and the Proposed Plan are part of the Administrative Record made available to the public and located in information repositories maintained at the EPA Docket Room in Region 7 and at the Holden city offices. The notice of availability of these documents and the Administrative Record was published in the <u>Warrensburg Daily Star</u> and the <u>Holden Progress</u>. A public comment period was held from June 20, 1991 to August 27, 1991. In addition, a public meeting was held on July 11, 1991. At this meeting, representatives from EPA and the State of Missouri answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision (ROD).

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The response action selected in this Record of Decision will address the contamination at the site not addressed during prior removal actions. This response action involves removal of PCB-contaminated soil, sediment, and debris from dismantling of building structures and concrete floors.

The remedial action selected in this Record of Decision is intended to address the entire site with regard to the principal threats to human health and the environment posed by contamination at the site as indicated in the endangerment assessment for the site. The findings of the endangerment assessment are included in the RI Report and are summarized in Section 6.0 of this document.

5.0 SUMMARY OF SITE CHARACTERISTICS

This section of the Record of Decision presents the results, conclusions and recommendations of the RI Report. The RI field work, conducted by the RCSC under EPA oversight from January 1989 to January 1990, included the following activities to define the nature and extent of the contamination present at the Rose site and to assess potential impacts of this contamination on public health, welfare, and the environment:

- A geologic and hydrogeologic investigation that included the drilling of eight deep and eight shallow borings; collection and analysis of soil samples from the eight deep borings; installation of 16 ground water monitoring wells in the boreholes; and subsequent collection and analysis of ground water samples from the 16 new and six pre-existing monitoring wells.
- Collection and analysis of surface soil samples from areas which were excavated during the removal effort due to the remaining high concentrations of PCBs.
- Collection and analysis of surface tracking samples from present and former traffic routes to and from the Rose site.
- A sewer investigation which included collection and analysis of sewer sediment and soil samples from 11 test pits adjacent to onsite sewers and performance of three dye tests.
- Collection and analysis of surface water and sediment samples from the East Pin Oak Creek, its unnamed tributary that runs through the southwest corner of the facility property, and onsite ponds.

- Collection and analysis of air quality samples during RI activities.

- A structure investigation including: a structural evaluation; analysis of wipe samples from interior and exterior building surfaces; analysis of samples from concrete, insulation, and impervious surfaces; and analysis of samples from subsurface soil from borings and two test trenches beneath the Main Building.

- An area features investigation which included identification of land uses and climatic conditions.

- Validation of data obtained from previous Rose site screening and characterization activities.

5.1 PHYSICAL CHARACTERISTICS

The Rose site is located within the corporate limits of Holden, Missouri. Surface features at the Rose site include a spill containment pond, three storm water retention ponds, an unnamed tributary which flows into East Pin Oak Creek, and a portion of East Pin Oak Creek. The Rose site slopes gently to the southwest. Land uses adjacent to the Rose site include agricultural, residential, and business/commercial.

According to the RI, no federally listed threatened or endangered wildlife species have been found in the vicinity of the Rose site. Information regarding this site has been provided to an appropriate natural resource trustee for evaluation. As of the date of this Record of Decision, a preliminary natural resource damage assessment has not been completed.

The Rose site surface water drainage is to the southwest at an overall slope of approximately five percent. The unnamed tributary to East Pin Oak Creek intercepts this drainage to the southwest and west of the site. The tributary flows northwest for approximately 1,000 feet where it combines with East Pin Oak Creek. East Pin Oak Creek flows in a northerly direction. Neither of these streams is a classified stream according to the Missouri Department of Natural Resources (MDNR).

Three primary geologic units were investigated at the Rose site. From the surface downward, they include the unconsolidated soil and weathered shale overburden, a series of shale and limestone interbeds, and a sandstone stratum.

The overburden soils consist of variable clays and silty clays ranging in thicknesses from 2 to 13.5 feet. The weathered shale ranges in thickness from 2 to 5 feet. No bedrock exposures on the Rose site were identified during the RI. The hydraulic conductivity of the overburden soils is in the range of 4×10^{-5} centimeters per second (cm/sec). The permeability of the overburden soils is substantially higher than that of the bedrock, thus, a small amount of ground water is perched on top of the bedrock surface. The flow rate of the ground water through the Rose site in the overburden soils is approximately 360 gallons per day (gpd) with an average linear ground water velocity of 15 feet per year. The flow in the overburden soils recharges the unnamed intermittent tributary on the southwestern part of the Rose site.

The series of shale and limestone beds varies in depth from 15 to 40 feet below land surface (bls) and has a very low permeability (normally on the order of 1×10^{-7} cm/sec). This is lower than the permeability of the overburden soils or the Labette Formation below and creates a preference for horizontal ground water flow rather than vertical.

The sandstone stratum is underlain by another series of shale and limestone interbeds. Ground water flow in the sandstone stratum is predominantly horizontal in a general northwesterly direction. The ground water flow rate in the sandstone stratum beneath the Rose site is approximately 1.2 gpd with an average linear ground water velocity of approximately 0.03 feet per year. The hydraulic conductivity of the sandstone stratum is approximately 1×10^{-6} cm/sec. The ground water in the sandstone stratum discharges to the outcrops in the ravine bottom of East Pin Oak Creek approximately 7,000 feet northwest and north of the Rose site.

The overburden soils and the sandstone stratum are the most important potential water-bearing geologic units. However, neither unit can be used as an aquifer since minimal hydraulic conductivities of aquifers are typically 5×10^{-3} cm/sec, while those reported for the overburden soils and sandstone stratum are approximately 4×10^{-5} and 1×10^{-6} cm/sec, respectively.

The potential for the upper, shallow ground water to percolate through the shales and limestones to the sandstone stratum exists, but it is believed that this movement would occur only over very long time periods because of the low hydraulic conductivity of the shales and limestone. It is unlikely that any significant amounts of contamination could be transported through the sandstone stratum due to its low transmitting ability.

5.2 NATURE AND EXTENT OF CONTAMINATION

Samples collected during the RI were analyzed for PCBs, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs), or for PCBs only, depending upon the media. SVOCs were rarely detected in significant quantities. The conclusions presented below deal mainly with PCBs and VOCs.

5.2.1 Subsurface Soils

Table 1 presents a summary of the subsurface soil sample analytical results which were obtained during the RI. Thirty-seven borings ranging in depth from 5 to 50 feet were drilled at the Rose site during the RI. Samples of subsurface soils were taken from 30 of the 37 borings. Generally, 2 to 4 samples were taken from each of the 30 borings at different depths (from near-surface to a depth of fifteen feet) and analyzed for PCBs, VOCs and SVOCs. Twenty of these borings were drilled beneath the Main Building and one was drilled beneath the South Warehouse. Thirteen test pits/trenches were excavated at the Rose site, eleven adjacent to onsite sewers and two inside the Main Building.

In regard to the exterior subsurface soils, the highest total PCB concentration of 700 parts per million (ppm) was detected in samples of subsurface soil collected adjacent to the storm and sanitary sewers leading from the Main Building. Of the nine exterior subsurface boring samples, lower concentrations (up to 6.3 ppm, but generally less than 1 ppm) of PCBs were detected mainly in the upper two feet of the subsurface soils near the Main Building and the South Warehouse.

In regard to interior subsurface soils, PCBs were detected in samples from 12 of the 20 boreholes beneath the Main Building. Total PCBs were detected: at less than 1 ppm in samples from 4 boreholes; between 1 ppm and 5 ppm in samples from 5 boreholes; and above 5 ppm in samples from 3 boreholes, with a maximum representative result of 18.5 ppm PCBs. PCBs were not detected in the subsurface soil sample from Boring B-10 in the South Warehouse.

The major concentrations of VOCs in exterior subsurface soil were detected in samples from beneath the onsite storm sewer which extends southwest from the Main Building; from beneath the Holden sanitary sewer line which crosses the Rose site from east to west; and from borings just north of the Main Building (boring from MW-110) and just west of the South Warehouse (boring from MW-104). VOCs were detected in the highest concentrations in subsurface soil samples from a test pit located near the Holden sanitary sewer in total concentrations of up to 9,400 parts per billion (ppb). The highest concentrations of total VOCs in exterior subsurface boring soil samples were 76 ppb (boring from MW-110) and 740 ppb (boring from MW-104).

VOCs were also detected in interior subsurface soil samples collected from borings beneath the buildings. Total VOC concentrations ranged from the detection limit (DL)[1] to a maximum of 3,325 ppb which was detected in a sample from beneath the South Warehouse, and a maximum of 488 ppb which was detected in a sample from beneath the Main Building.

PCBs and VOCs were detected mainly at the top of the overburden soil underneath the Main Building. However, beneath the South Warehouse where the overburden soil is thinner, VOCs were detected down to the bedrock/soil interface, approximately 3 feet below the surface.

The total volume of subsurface soil exceeding 10 ppm PCBs requiring remediation is approximately 1200 cubic yards (cy). The excavation and subsequent disposal or treatment of this soil will address both PCB and VOC contamination.

5.2.2 Surface Soil

Table 2 presents a summary of the surface soil sample analytical results which were obtained during the RI. The surface soil samples collected during the RI were analyzed only for PCBs.

PCBs were detected in surface soils primarily over the eastern part of the site where Rose operations were carried out. Sample analysis indicates surface soils containing PCBs at concentrations of 10 ppm or higher are generally located adjacent to the Main Building and the South Warehouse, in the area between the two buildings, and in the area to the west of both buildings. The PCB concentrations in surface soil samples were less than 10 ppm at more than one-half of the areas from which surface soils were excavated during the removal conducted under the second AOC. Total PCB concentrations in surface soil samples ranged from the DL to the highest concentration of 540 ppm, which was from a sample taken from a segment of a 50- by 50-foot grid in the southwest corner of the site near the South Warehouse.

An average total PCB concentration of 1.1 ppm (with a range from the DL to 3.4 ppm) characterizes the distribution of PCBs in surface soils in an offsite area extending from the eastern Rose site boundary east to a distance of 80 feet and from McKissock

[1] The analytical detection limit varied in the various sample analyses conducted during the RI. The specific detection limit for each sample analysis that detected contamination can be found in the tables in the RI Report.

Street north to a distance of 160 feet. Wipe samples collected in the road at the two major site access points had an average total PCB concentration of less than 4 micrograms (μg) per 100 square centimeters (cm^2).

The total volume of surface soil exceeding 10 ppm PCBs requiring remediation is approximately 2,600 cy.

5.2.3 Ground Water

Table 3 presents a summary of the ground water sample analytical results which were obtained during the RI. Four rounds of ground water samples were collected and analyzed. Where a sufficient ground water sample was obtained, samples were analyzed for PCBs, VOCs and SVOCs. Sampling procedures in rounds 1 and 2 were suspected to have allowed ground level airborne dust or surface soils contaminated with low concentrations of PCBs to contaminate the ground water samples. For the third and fourth rounds of sampling, samples were collected in a manner to avoid the potential contamination of the ground water samples by surface dust or soils. It appears that the third and fourth rounds provide the most representative data on PCB concentrations in ground water at the Rose site. All four rounds provide representative data on VOC concentrations in the ground water.

PCBs were detected in unfiltered ground water samples from MW-207 and MW-204 collected in the third sampling round. The concentration of total PCBs detected in MW-204 was 1.3 micrograms per liter ($\mu g/l$), only slightly greater than the detection limit of 0.5 $\mu g/l$. The concentration of total PCBs in MW-207 was 22.5 $\mu g/l$. PCBs were not detected in any Round 4 ground water sample.

Elevated levels of several VOCs were detected primarily in the shallow ground water and were consistently detected in all four sampling rounds in shallow groundwater monitoring wells MW-201, MW-204, MW-210, and MW-211. Monitoring wells MW-201 and MW-204 are located near and downgradient of the South Warehouse, which formerly contained a degreasing pit. Monitoring well MW-210 is near the north door of the Main Building. Monitoring well MW-211 is near the sanitary and/or storm sewers. The most significant levels of VOCs were detected in samples from MW-204 and MW-210, with total VOCs ranging from 59,000 $\mu g/l$ to 75,300 $\mu g/l$ (MW-204) and from 6,900 $\mu g/l$ to 11,100 $\mu g/l$ (MW-210). Table IV-8 of the RI Report identifies the VOCs and the levels detected during each ground water monitoring round.

5.2.4 Sediments

Table 4 presents a summary of the sediment sample analytical results which were obtained during the RI. All sediment samples were analyzed for PCBs, VOCs and SVOCs. Samples were collected from East Pin Oak Creek, the unnamed tributary, the onsite Holden sanitary sewer manhole, the spill containment and storm water retention ponds, and the drainage ditch which carries storm water from the storm sewer outfall to the storm water retention pond.

PCBs at concentrations greater than 10 ppm were detected in sediment samples collected from East Pin Oak Creek, the unnamed tributary, the spill containment pond, and the drainage ditch. Total PCB concentrations in the 21 samples from East Pin Oak Creek ranged from the DL to 293 ppm. Total PCB concentrations in the 17 samples taken from the unnamed tributary ranged from the DL to 20.8 ppm. The highest PCB concentrations detected in sediment samples collected from East Pin Oak Creek were in a segment extending from the Holden Publicly Owned Treatment Works (POTW) outfall to approximately 500 feet downstream. Total PCB concentrations in samples taken from the onsite spill containment pond were 23.9 and 122 ppm. Total PCB concentrations in samples taken from the drainage ditch were and 2.2 and 24.1 ppm.

VOCs were detected in sediment samples taken from East Pin Oak Creek and the unnamed tributary. Except for two samples from East Pin Oak Creek (one that contained toluene at 6.2 ppm and one that contained total xylenes at 1.8 ppm), the VOCs detected in samples from the creek and tributary were below 1 ppm. Toluene at 11 ppm was found in a sample of sediments from the Holden sanitary sewer line upgradient from the Rose connection to the sewer. Other VOCs were detected in samples from the sewer line, but at levels less than 1 ppm (this line was disconnected under the terms of the second Administrative Order). Total VOCs detected in samples from the spill containment and storm water retention ponds and the drainage ditch were less than 1 ppm in each sample.

The volume of sediments in the unnamed tributary and East Pin Oak Creek requiring remediation is approximately 826 cy. Remediation will address PCB and VOC contamination.

5.2.5 Surface Water

Table 5 presents a summary of the surface water sample analytical results which were obtained during the RI. Samples were collected from East Pin Oak Creek, the unnamed tributary, the spill containment pond, the main concrete pit in the Main Building, and at the former storm sewer discharge point to the unnamed tributary. Generally, two samples were collected from each sampling location, one which was filtered prior to analysis and one which was unfiltered. Samples were analyzed for PCBs, VOCs and SVOCs.

Surface water samples collected from East Pin Oak Creek and the unnamed tributary contained levels of total PCBs at approximately one-half of the locations sampled in filtered and unfiltered samples. Concentrations ranged from the DL to 21 μg/l in East Pin Oak Creek. PCBs were not detected in surface water samples collected from the unnamed tributary. The distribution of PCBs in East Pin Oak Creek surface water appears to be random. PCBs were also detected in surface water samples collected from the spill containment pond at levels from the DL to 10 μg/l. PCBs were detected in three surface water samples collected from the main concrete pit in the Main Building at levels from 3.5 milligrams per liter (mg/l) to 4.5 mg/l. No PCBs were detected in samples collected at the former storm sewer discharge point.

VOCs were detected in some surface water samples collected from East Pin Oak Creek and the unnamed tributary, including the storm sewer discharge point. Total VOC concentrations in samples from East Pin Oak Creek and the unnamed tributary, excluding suspected laboratory artifacts, ranged from the DL to approximately 78 μg/l. There are no apparent trends relative to surface water VOC contamination in East Pin Oak Creek or the unnamed tributary. Several VOCs were detected in water samples from the main concrete pit in the Main Building. These water samples contained elevated levels of 1,1-dichloroethene (5-68 μg/l), 1,1,1-trichloroethane (45-490 μg/l), 1,2,4-trichorobenzene (200-410 μg/l), and 1,2,4,5-tetrachlorobenzene (160-230 μg/l).

The surface water retention and spill containment ponds have a total capacity of approximately 424,400 gallons. This water, along with any water collected during the implementation of the remedial action from the main pit, the creek or tributary, will be treated prior to discharge from the site. Depending upon the concentration of residual contaminants that may remain following treatment, this water will be discharged to the unnamed tributary, East Pin Oak Creek, or the Holden treatment plant, or will be land-applied onsite.

5.2.6 Air

Air samples collected from worker breathing zones during the in-building RI activities contained dust (particulate) concentrations of 0.2 to 0.5 milligrams per cubic meter (mg/m^3). No PCBs or VOCs were detected in these dust samples. These samples were taken in accordance with the Health and Safety Plan.

5.2.7 Buildings and Structures

Table 6 presents a summary of the Main Building and the South Warehouse sample analytical results which were obtained during the RI. Samples were taken from various structural surfaces, concrete floors at depth (0.5 to 2 inches), and miscellaneous structure materials in the buildings. Surface sampling was accomplished using a wipe sampling procedure. All building and structure samples were analyzed only for PCBs.

5.2.7.1 Main Building.

Total PCB concentrations detected in wipe samples collected from the interior floor, wall, ceiling and horizontal beam and fixture surfaces of the Main Building exceeded 10 $\mu g/100\ cm^2$, a level set for high contact surfaces by the PCB Spill Cleanup Policy. Total PCB concentrations in wipe samples from the interior of the Main Building were: floor samples ranging from the DL to 1,160,000 $\mu g/100\ cm^2$; wall samples ranging from the DL to 3,390 $\mu g/100\ cm^2$ (from the main concrete pit); ceiling samples ranging from the DL to 81.5 $\mu g/100\ cm^2$; and horizontal beam and fixture samples ranging from the DL to 830 $\mu g/100\ cm^2$. Total PCB concentrations in wipe samples from the exterior surfaces of the Main Building ranged from the DL to 9.6 $\mu g/100\ cm^2$.

A total of 11 unbiased (random) and 11 biased (from visibly stained areas) concrete cores were removed from the building floor. The top 0.5 inch of each of the cores was ground and analyzed for PCBs. Total PCB concentrations in the top 0.5 inch of concrete core samples taken from the Main Building floor are summarized as follows:

	Total PCBs (ppm)		
Sample	Max.	Avg.	Min.
Unbiased concrete cores	4,390	979	0.15
Biased concrete cores	670,000	214,000	4,900

Three additional samples were collected from each of two concrete cores previously taken from the Main Building to determine the vertical extent of PCB migration into the concrete floor slab. Samples were taken at depths of 0.5 to 1.0 inches, 1.0 to 1.5 inches, and 1.5 to 2.0 inches in each of two cores. One core had the highest total PCB concentration at the surface, while the other had the highest concentration below the surface (0.5 to 1.0 inches). In both samples, the concentrations decreased with depth once the maximum concentration was reached. The total depth of detectable PCB concentrations in the concrete floor slabs could not be ascertained from the existing data collected during the RI.

Insulation cores removed from walls and ceilings were analyzed. Total PCB concentrations ranged from 5.7 micrograms per sample (ceiling) to 25,800 micrograms per sample (ceiling). Destructive samples were collected from nonimpervious rubber, wood and linoleum materials in the Main Building. Total PCBs were detected in seven of the eight samples collected, ranging from 23.1 to 16,600 micrograms per sample.

As indicated in Section 5.2.1 of this Record of Decision, analyses of soil samples collected from beneath the concrete floor of the Main Building indicate concentrations of total PCBs at levels less than 20 ppm, ranging from the DL to 18.5 ppm. Based upon the results of analysis of soil under the concrete floor, it appears that PCB migration through the floor of the Main Building to the underlying soils has not been extensive. PCBs have been primarily contained within the floor slab.

Analyses of soil samples collected from beneath the concrete floor indicate that VOCs are present under the western half of the Main Building. The highest VOC concentrations were found in soil samples collected from beneath the concrete floor between the two pits where solvents were reportedly used and stored by Rose. These concentrations were as high as 488 ppb.

The Main Building consists of approximately 4,620 tons of building material requiring remediation under the selected remedy. This figure includes 4,100 tons of concrete. The volume of soils from beneath the concrete floor slab which will require removal is included with the total volume of subsurface soils, as described in Section 5.2.1 of this Record of Decision.

5.2.7.2 South Warehouse.

Wipe samples were collected from the interior floor, wall, ceiling, and horizontal beam and fixture surfaces of the South Warehouse. Generally, analysis of these samples showed concentrations of PCBs at levels exceeding 10 $\mu g/100\ cm^2$, a level set for high contact surfaces by the PCB Spill Cleanup Policy. Total PCB concentrations in wipe samples from the interior of the South Warehouse were: floor samples ranging from 3.5 to 19,500 $\mu g/100\ cm^2$; wall samples ranging from the DL to 85.6 $\mu g/100\ cm^2$; ceiling samples ranging from 3.5 to 29.7 $\mu g/100\ cm^2$; and horizontal beam or fixture samples ranging from 7.1 to 69 $\mu g/100\ cm^2$. Total PCB concentrations in wipe samples from the exterior surfaces of the South Warehouse ranged from the DL to 21.9 $\mu g/100\ cm^2$.

One unbiased and two biased concrete cores were removed from the warehouse floor. The top 0.5 inch of each of the cores was ground and analyzed for PCBs. Total PCB concentrations in the top 0.5 inch of each concrete core sample were 548 ppm from the unbiased core sample, and 3500 ppm and 270,000 ppm from the biased core samples. As concluded for the Main Building, PCBs are primarily contained in the concrete floor slab of the South Warehouse.

Insulation cores were removed from the walls and ceilings of the South Warehouse. Total PCB concentrations ranged from 24 micrograms per sample (wall) to 7,900 micrograms per sample (ceiling).

As previously described in Section 5.2.1 of this Record of Decision, soil samples collected from one soil boring beneath the South Warehouse were analyzed for PCBs and VOCs. There were no detectable levels of PCBs in these soil samples. Total VOC concentrations in the soil samples decreased with depth from 3325 ppb at 0.5 to 1.0 feet to 12 ppb at 5.0 to 6.0 feet.

The South Warehouse consists of approximately 462 tons of building materials requiring remediation under the selected remedy. This includes 425 tons of concrete. The volume of soils from beneath the concrete floor slab which will require remediation is included with the total volume of subsurface soils as described in Section 5.2.1 of this Record of Decision.

6.0 SUMMARY OF SITE RISKS

As part of the RI/FS, an endangerment assessment (EA) was conducted to assess the current and potential risks to human health and the environment that are associated with the release or threatened release of hazardous substances at the Rose site. Both current and future use scenarios were evaluated. This section summarizes the findings concerning risks of exposure to contaminated sediment, surface and subsurface soils, surface water, ground water and building surfaces.

6.1 SELECTION OF INDICATOR CHEMICALS

A total of 44 chemicals were identified in the various media sampled at the Rose site. Due to the wide variations in occurrence, concentration, and toxicity among contaminants, indicator chemicals were selected to focus on those chemicals that are most likely to pose the greatest potential public health and environmental risk. Indicator chemicals were selected based upon the frequency of detection, concentration, toxicity, environmental mobility, and persistence. The eleven indicator chemicals selected for the Rose site were: PCB Aroclor 1242; PCB Aroclor 1254/1260; 1,1-dichloroethane; 1,1-dichloroethene; g-hexachlorocyclohexane (lindane); methylene chloride; tetrachloroethene; toluene; 1,2,4-trichlorobenzene; 1,1,1-trichloroethane; and trichloroethene.

6.2 TOXICOLOGICAL EVALUATION

To assess the potential health risks associated with exposure to the indicator chemicals selected for the Rose site, assessments published by EPA on the observed effects in humans or laboratory animals exposed to the chemical were reviewed.

The toxic effects of chemicals can be expressed through the use of Reference Doses (RfDs) and Cancer Potency Factors (CPFs). An RfD is a conservative estimate of a daily human exposure that is unlikely to result in deleterious effects following chronic exposure. A CPF represents the slope of the tumorigenic dose-response curve in the low-dose region. EPA has developed and published both route-specific RfDs for carcinogenic and non-carcinogenic chemicals, and CPFs for carcinogens.

CPFs have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(ppm/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in ppm/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

RfDs have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are likely to have appreciable risks of adverse health effects. Estimated intakes of chemicals from environmental media (for example, the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

The CPFs and RfDs for the Rose site indicator chemicals are listed in Table 7.

6.3 EXPOSURE ASSESSMENT

Exposure assessment is the identification of populations potentially exposed to chemicals and the determination of the potential magnitude and duration of their exposures. In this EA, the exposure assessment included three steps: identification of exposure pathways; estimation of environmental concentrations; and estimation of human doses.

Pathways by which a population or an individual could be exposed to chemicals originating from the Rose site under current or hypothetical future uses of the Rose site and surrounding area were identified. Three potential future scenarios for use of the Rose site were evaluated. They are no future use, industrial development, and residential development. The exposure pathways for each of the three hypothetical scenarios identified for the Rose site are summarized in Table 8.

The level of potential exposure through the various pathways is dependent upon an individual's location and behavior. For each pathway considered in the EA, "typical" and "reasonable worst" case exposures were calculated. The typical case represents the exposure of an individual with somewhat normal activity patterns and generally makes use of assumptions considered to be best estimates. The reasonable worst case provides a more conservative, but still possible, upper bound exposure.

6.4 RISK CHARACTERIZATION

Excess lifetime cancer risks are determined by multiplying the intake level by the CPF. These resultant risks are probabilities that are generally expressed in scientific notation (for example, 1×10^{-6} or $1E^{-6}$). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million additional chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Estimates of excess lifetime cancer risk were calculated by multiplying the lifetime average daily dose (LADD) by the CPF. In interpreting cancer risk estimates, the NCP states that for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound life-time cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response.

The potential for adverse non-carcinogenic effects was derived by calculating the MDD/RfD ratio, where MDD is the maximum daily dose. A ratio greater than one suggests that the exposure should be closely examined for potential adverse effects, although there is no sharp demarcation between safe and unsafe. Because the exposure is based on conservative assumptions and the RfD is derived using safety factors, the MDD may exceed the RfD somewhat.

Tables 9 and 10 present the excess carcinogenic risks and non-carcinogenic effects, respectively, for the three hypothetical exposure scenarios. The potential unacceptable risks for a typical case exposure for each scenario are summarized below:

- No Future Use
  - Onsite cancer risks to the trespasser are unacceptable for dermal contact with the existing building floors and for indoor vapor inhalation in the existing buildings. Unacceptable non-carcinogenic effects result from the same pathways.

  - Cancer risks to the offsite resident are unacceptable for vegetable and beef ingestion, dermal contact with sediment, and outdoor vapor inhalation. Unacceptable non-carcinogenic effects are limited to beef ingestion.

- Industrial Development
  - Cancer risks to the future onsite industrial worker are unacceptable for dermal contact with the existing building floors and walls and for indoor vapor inhalation. The unacceptable non-carcinogenic effects are due to dermal contact with the floors and indoor vapor inhalation.

- Residential Development
  - Cancer risks are unacceptable to the future onsite resident for vegetable ingestion, dermal contact with sediment, indoor vapor inhalation and for child soil ingestion. The unacceptable non-carcinogenic effects are due to the indoor vapor inhalation pathway.

Information regarding the site has been provided to an appropriate natural resources trustee. As of the date of issuance of this Record of Decision, the preliminary natural resource damage assessment has not been completed.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

7.0 REMEDIAL ACTION OBJECTIVES

Remedial action objectives define the allowable exposures to compounds of interest found in the various media at the Rose site. The EA concluded for all scenarios that the contaminants found at the Rose site posed no known risks to terrestrial wildlife, livestock, terrestrial vegetation, or aquatic life. Therefore, the remedial action objectives are based on human health risks and hazards only, including ingestion of contaminated beef and dermal contact. The compounds of interest include only PCBs and VOCs. The objectives addressing PCBs for each media of interest will also address human health risks and hazards for VOCs.

The following media of interest were selected based on the EA findings:

- Site soils.
- Sediments.
- Site buildings.
- Surface waters.
- Offsite soils.
- Ground water

7.1 SITE SURFACE SOILS REMEDIAL ACTION OBJECTIVES

The remedial action objectives for onsite soils for human health effects are: to prevent exposure to levels of contamination in surface soils that fall outside of the acceptable risk range for excess cancer risk in typical exposures for the pathways of soil ingestion and ingestion of vegetables grown on the site; to comply with chemical-specific applicable or relevant and appropriate requirements (ARARs); and to comply with other criteria to be considered (TBCs), including the PCB Spill Cleanup Policy which, for the residential scenario, requires preventing exposure to onsite soils with PCB concentrations greater than 10 ppm.

7.2 SITE SUBSURFACE SOILS REMEDIAL ACTION OBJECTIVES

The remedial action objectives for onsite subsurface soils are: to prevent exposure to levels of contamination in subsurface soils that fall outside of the acceptable risk range for excess cancer risk in typical exposures for the pathway of indoor vapor inhalation; and to comply with ARARs and TBCs, including the PCB Spill Cleanup Policy which, for the residential scenario, requires preventing exposure to subsurface soils with PCB concentrations greater than 10 ppm.

7.3 OFFSITE SURFACE SOILS REMEDIAL ACTION OBJECTIVES

Current conditions are protective of human health and no ARARs or TBCs were identified. Therefore, no remedial action is required for offsite surface soils.

7.4 SEDIMENTS REMEDIAL ACTION OBJECTIVES

The remedial action objectives for human health effects due to sediments in East Pin Oak Creek and the unnamed tributary are: to prevent ingestion of sediments by beef cattle that could eventually be consumed by humans; to prevent human dermal exposure to sediments containing PCBs at levels that fall outside of the acceptable risk range for excess cancer risks; and, for compliance with chemical-specific ARARs and TBCs, to prevent exposure to sediments which have PCB concentrations greater than 10 ppm in non-restricted access areas.

7.5 BUILDINGS AND STRUCTURES REMEDIAL ACTION OBJECTIVES

Remedial action objectives for human health effects due to exposure to buildings and structures were developed. One objective is to prevent inhalation of vapors and to prevent direct contact with levels of contamination on the walls and floors that fall outside of the acceptable risk range for excess cancer risks from PCBs and that would result in unacceptable adverse non-carcinogenic effects (MDD/RfD>1.0) in typical exposures. In order to comply with chemical-specific ARARs and TBCs, the objective is to prevent exposure to building surfaces with PCB concentrations greater than 10 $\mu g/100\ cm^2$, the level established by the PCB Spill Cleanup Policy.

7.6 SURFACE WATERS REMEDIAL ACTION OBJECTIVES

All surface waters involved in response activities will be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water will be land-applied onsite or be discharged to area tributaries, creeks or streams. The treated water will meet Clean Water Act discharge limitations established by EPA or MDNR prior to discharge.

7.7 GROUND WATER REMEDIAL ACTION OBJECTIVES

The National Contingency Plan at 40 C.F.R. § 300.430(a)(iii)(F) states "EPA expects to return usable ground waters to their beneficial uses whenever practicable,..." At this site, there is little or no potential beneficial use of the shallow ground water. At present, and prior to the discovery of contamination on the site, no use was being made of the shallow ground water. Since the shallow ground water discharges into the unnamed tributary, future monitoring of the shallow ground water will determine future improvements in the ground water quality resulting from the removal of the source of contamination, as well as identify any future unforeseen degradation of the deep or shallow ground water, which might result in recontamination of the adjacent unnamed tributary and/or East Pin Oak Creek.

8.0 DESCRIPTION OF ALTERNATIVES

The remedial alternatives evaluated in detail in the FS report are described in the following subsections and are set forth in the chart at the end of this section. These descriptions identify engineering components, institutional controls, implementation requirements, estimated costs, and ARARs associated with each alternative.

For each alternative which involves the removal of PCB-contaminated material, the FS evaluated three disposal options. They are: the offsite landfilling of all removed PCB-contaminated wastes; the offsite incineration of all removed PCB-contaminated wastes; and the onsite incineration of all removed PCB-contaminated wastes. In describing each alternative, references to landfilling mean an offsite TSCA approved chemical waste landfill and references to incineration mean facilities meeting the requirements of the PCB regulations for incinerators. Under each alternative, the present worth cost and implementation time for each disposal option are presented here as set forth in the FS.

8.1 ALTERNATIVE 1: NO ACTION

The NCP requires the no action alternative be evaluated for every site. The no action alternative at the Rose site consists of: extending the existing perimeter fence to enclose a portion of the unnamed tributary; the posting of warning signs; and instituting deed restrictions prohibiting future use of or access to the site. All deed restrictions, discussed under this and all other alternatives, would necessarily have to be implemented by site's property owner; currently the City of Holden, Missouri. No ground water monitoring would be conducted under the no action alternative.

Because this alternative would result in contaminants remaining onsite, CERCLA would require that the site be reviewed every five years. If justified by the review, remedial actions would be implemented at that time to remove and dispose or treat the wastes.

The present worth cost of this alternative for a 30-year period is approximately $81,000, assuming no action resulted from EPA's five-year review. The time required to implement this alternative is 2 months.

8.2 ALTERNATIVE 2: REMOVE STREAM PCB SEDIMENTS; CAP SITE

Under this alternative, stream sediments containing PCBs at concentrations greater than 0.18 ppm (the level determined in the RI to represent a threat to human health as the result of ingestion of beef that drink from the stream) would be excavated from East Pin Oak Creek and the unnamed tributary and site soils which exceed 10 ppm PCBs would be capped. In addition, all building doors and openings would be boarded closed and the buildings would be fenced.

It is expected that approximately 826 cy of sediments would be removed from the unnamed tributary and East Pin Oak Creek and dewatered. Subsequent sampling and analysis will be conducted to confirm that remaining sediments do not exceed 0.18 ppm. The removed sediments would then be either incinerated (on- or offsite) or landfilled offsite. Any water removed from the tributary and the creek or their sediment, and any water from the onsite ponds or pits, would be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

The cap would be a multimedia cap consisting of two feet of compacted clay, a 40-mil synthetic liner, one foot of sand, a layer of filter fabric, and two feet of revegetated topsoil. The cap would cover approximately 71,000 square feet. Any soils which cannot practically be capped (such as those adjacent to buildings or property lines) would be excavated and either incinerated (on- or offsite) or landfilled offsite.

Monitoring of the shallow and deep ground water for PCBs, VOCs, and metals would be conducted for a 10-year period.

Deed restrictions would be implemented to prohibit any access to or use of the site, except for the installation of shallow ground water wells for ground water monitoring purposes.

The following table represents the total present worth (PW) cost and implementation time for all of the actions, including ground water monitoring, necessary to implement Alternative 2, with each of the three treatment or disposal options, as found in the Feasibility Study (FS):

ALTERNATIVE 2

Offsite Landfill Option

Capital Cost: $3,303,908
Annual O&M: $31,134
PW: $3,622,292
Months to Implement: 8

Offsite Incineration Option

Capital Cost: $9,744,742
Annual O&M: $31,134
PW: $10,063,126
Months to Implement: 38

Onsite Incineration Option

Capital Cost: $6,546,485
Annual O&M: $31,134
PW: $6,864,869
Months to Implement: 30

8.3 ALTERNATIVES 3A & 3B: REMOVE PCB SEDIMENTS; CAP OR REMOVE SITE SOILS; DECONTAMINATE BUILDINGS AND CONCRETE

Alternatives 3A and 3B would limit future use of the site to activities that would not disturb the soil cap or building encapsulation. These alternatives are the same as Alternative 2, except that the buildings' skin, structural members, and concrete would be cleaned using physical and chemical methods. In addition, site soils exceeding 10 ppm PCBs would be excavated under Alternative 3B.

It is expected that approximately 826 cy of sediments would be removed from the unnamed tributary and East Pin Oak Creek and dewatered. Subsequent sampling and analysis will be conducted to confirm that remaining sediments do not exceed 0.18 ppm. The removed sediments would then be either incinerated (on- or offsite) or landfilled offsite. Any water removed from the tributary and the creek or their sediment, and any water from the onsite ponds or pits, would be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

Under Alternative 3A, site soils with PCB concentrations greater than 10 ppm PCBs would be capped. Under Alternative 3B, site soils exceeding 10 ppm PCBs would be excavated and either incinerated (on- or offsite) or landfilled offsite. Under Alternative 3B, approximately 2,600 cy of soil would be removed. All excavated areas would be backfilled with a minimum of 10 inches of clean soil.

Under Alternatives 3A and 3B the building insulation would be removed and then treated or disposed of in the same manner as the site soils under Alternative 3B; the contaminated building structures would be steam cleaned and solvent washed. In both these alternatives, areas of the concrete slabs which are heavily stained would be removed and treated by incineration or disposed of by landfilling. Estimates in the FS indicate that 202 cubic yards of concrete would be removed. The remainder of the slabs would be scarified, solvent washed, and finally encapsulated within an impervious coating.

Deed restrictions would prohibit any use of the site that would result in disturbance of the soil cap or building encapsulation. The deed restrictions may allow for restricted access future use of the site if the deed restrictions are complied with, but would prohibit future non-restricted access to the site. The deed restrictions would also prohibit the installation of shallow ground water wells for purposes other than monitoring.

Ground water monitoring would be conducted in the same manner as described for Alternative 2.

The following table represents the total present worth (PW) cost and implementation time for all of the actions, including ground water monitoring, necessary to implement Alternatives 3A and 3B, with each of the three treatment or disposal options, as found in the FS:

ALTERNATIVE 3A

Offsite Landfill

Capital Cost: $6,884,361
Annual O&M: $30,634
PW: $7,195,060
Months to Implement: 11

Offsite Incineration

Capital Cost: $14,458,679
Annual O&M: $30,634
PW: $14,769,378
Months to Implement: 45

Onsite Incineration

Capital Cost: $10,616,546
Annual O&M: $30,634
PW: $10,927,245
Months to Implement: 30

ALTERNATIVE 3B

Offsite Landfill

Capital Cost: $9,049,243
Annual O&M: $24,134
PW: $9,260,037
Months to Implement: 10

Offsite Incineration

Capital Cost: $22,574,593
Annual O&M: $24,134
PW: $22,785,387
Months to Implement: 83

Onsite Incineration

Capital Cost: $15,853,617
Annual O&M: $24,134
PW: $16,064,411
Months to Implement: 33

8.4 ALTERNATIVE 4: REMOVE PCB SEDIMENTS; CAP SITE SOILS AND CONCRETE; REMOVE BUILDINGS

Alternative 4 would limit future use of the site to activities that would not disturb the soil cap or building encapsulation. This alternative is similar to 3A, except that the buildings are to be removed and the cap would be extended to cover the concrete slabs.

It is expected that approximately 826 cy of sediments would be removed from the unnamed tributary and East Pin Oak Creek and dewatered. Subsequent sampling and analysis will be conducted to confirm that remaining sediments do not exceed 0.18 ppm. The removed sediments would then be either incinerated (on- or offsite) or landfilled offsite. Any water removed from the tributary and the creek or their sediment, and any water from the onsite ponds or pits, would be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

The buildings, except the concrete slabs, would be removed using conventional demolition equipment. The removed building materials would be disposed of in the same manner as the sediments.

The area to be capped would include site soils with PCB concentrations above 10 ppm and the concrete slabs. The cap would cover approximately 275,000 square feet.

Ground water monitoring would be conducted in the same manner as described for Alternative 2.

Deed restrictions would be the same as described in Alternatives 3A and 3B.

The following table represents the total present worth (PW) cost and implementation time for all of the actions, including ground water monitoring, necessary to implement Alternative 4, with each of three treatment or disposal options, as found in the FS:

<u>ALTERNATIVE 4</u>

Offsite Landfill Option

Capital Cost: $5,694,954
Annual O&M: $37,016
PW: $6,103,745
Months to Implement: 17

Offsite Incineration Option

Capital Cost: $13,975,620
Annual O&M: $37,016
PW: $14,384,411
Months to Implement: 54

Onsite Incineration Option

Capital Cost: $10,043,150
Annual O&M: $37,016
PW: $10,451,941
Months to Implement: 31

8.5 ALTERNATIVES 5A & 5B: REMOVE PCB SEDIMENTS; CAP OR REMOVE SITE SOILS; DECONTAMINATE BUILDINGS; REMOVE CONCRETE

Alternatives 5A and 5B would limit future use of the site to activities that would not disturb the soil cap. Alternatives 5A and 5B are the same as Alternatives 3A and 3B, respectively, except that under both Alternatives 5A and 5B the entire concrete slab from the Main Building and the South Warehouse and contaminated soil beneath each concrete slab would be removed.

It is expected that approximately 826 cy of sediments would be removed from the unnamed tributary and East Pin Oak Creek and dewatered. Subsequent sampling and analysis will be conducted to confirm that remaining sediments do not exceed 0.18 ppm. The removed sediments would then be either incinerated (on- or offsite) or landfilled offsite. Any water removed from the tributary and the creek or their sediment, and any water from the onsite ponds or pits, would be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

Under Alternatives 5A and 5B, the concrete slabs would be removed using conventional demolition techniques, leaving footings necessary for the structural integrity of the buildings. In Alternatives 5A and 5B, soils beneath the concrete slabs contaminated with greater than 10 ppm PCBs would be excavated and treated or disposed of in the same manner as the sediment. All excavated areas would be backfilled with a minimum of 10 inches of clean soil.

Under Alternative 5A, approximately 1034 cy of soil would be excavated and treated by incineration or disposed of by landfilling, and 71,000 square feet would be capped. Under Alternative 5B, approximately 4788 cy of soil would be removed and treated by incineration or disposed of by landfilling, and no capping would be done. All excavated areas would be backfilled with a minimum of 10 inches of with clean soil.

Ground water monitoring would be conducted in the same manner as described for Alternative 2.

Deed restrictions would be the same as described in Alternatives 3A and 3B.

The following table represents the total present worth (PW) cost and implementation time for all of the actions, including ground water monitoring, necessary to implement Alternatives 5A and 5B, with each of the three treatment or disposal options, as found in the FS:

ALTERNATIVE 5A

Offsite Landfill
Capital Cost: $8,487,531
Annual O&M: $30,634
PW: $8,798,230
Months to Implement: 16

Offsite Incineration
Capital Cost: $23,100,515
Annual O&M: $30,634
PW: $23,411,214
Months to Implement: 91

Onsite Incineration
Capital Cost: $15,342,108
Annual O&M: $30,634
PW: $15,652,807
Months to Implement: 34

ALTERNATIVE 5B

Offsite Landfill
Capital Cost: $12,982,503
Annual O&M: $24,134
PW: $13,193,297
Months to Implement: 14

Offsite Incineration
Capital Cost: $39,528,358
Annual O&M: $24,134
PW: $39,739,152
Months to Implement:148

Onsite Incineration
Capital Cost:$26,112,947
Annual O&M: $24,134
PW: $26,323,741
Months to Implement: 40

8.6 ALTERNATIVE 6: REMOVE PCB SEDIMENTS, SITE SOILS, BUILDINGS AND CONCRETE

This alternative is similar to Alternative 3B, except that Alternative 6 removes the buildings and all concrete from the site instead of decontaminating them.

It is expected that approximately 826 cy of sediments would be removed from the unnamed tributary and East Pin Oak Creek and dewatered. Subsequent sampling and analysis will be conducted to confirm that remaining sediments do not exceed 0.18 ppm. The removed sediments would then be either incinerated (on- or offsite) or landfilled offsite. Any water removed from the tributary and the creek or their sediment, and any water from the onsite ponds or pits, would be treated using activated carbon. Depending upon the concentration of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

Under this alternative, all soils with PCB concentrations greater than 10 ppm would be excavated and either treated by incineration or disposed by landfilling. Under Alternative 6, approximately 4788 cy of soil would be excavated. All excavated areas would be backfilled with a minimum of 10 inches of clean soil.

The FS indicates that these actions, along with a deed restriction requiring the placement of 10 inches of clean soil between the existing site soils and all surfaces of below ground structures (i.e., basements) constructed on the site, would allow future residential use of the site. The EPA has determined that implementation of Alternative 6 would allow the site to be considered a non-restricted access area. Additional restrictions for residential development are not necessary. However, deed restrictions would be required for this alternative prohibiting the installation of shallow ground water wells for purposes other than monitoring.

Under Alternative 6, the building insulation would be removed and then either treated by incineration or disposed of by landfilling. The building structures would be removed and either cleaned and scraped or sent to landfill or incinerated. The concrete slabs would be completely removed and either treated by incineration or disposed of by landfilling.

Ground water monitoring would be conducted in the same manner as described for Alternative 2.

The following table represents the total present worth (PW) cost and implementation time for all of the actions, including ground water monitoring, necessary to implement Alternative 6, with each of the three treatment or disposal options, as found in the FS:

ALTERNATIVE 6

Offsite Landfill Option

Capital Cost: $12,368,962
Annual O&M: $22,734
PW: $12,558,238
Months to Implement: 12

Offsite Incineration Option

Capital Cost: $41,523,787
Annual O&M: $22,734
PW: $41,713,063
Months to Implement: 154

Onsite Incineration Option

Capital Cost: $25,564,840
Annual O&M: $22,734
PW: $25,754,116
Months to Implement: 41

ALTERNATIVE REMEDIAL ACTIONS

IDENTIFIED IN FEASIBILITY STUDY

	SOILS & POND SEDIMENT	CREEK SEDIMENT	BUILDING	CONCRETE SLAB	GROUND WATER	FUTURE USE
ALT 1	NO ACTION	NO ACTION	FENCE & BOARD UP	NO ACTION	NO ACTION	NO ACCESS OR USE
ALT 2[2]	CAP[3] > 10 PPM	REMOVE[4]	FENCE & BOARD UP	NO ACTION	MONITOR FOR 10 YEARS	NO ACCESS OR USE
ALT 3A	CAP > 10 PPM	REMOVE	REMOVE INSULA-TION & CLEAN	CLEAN & CAP OR REMOVE	MONITOR FOR 10 YEARS	INDUSTRIAL ONLY NO WELLS
ALT 3B	REMOVE > 10 PPM	REMOVE	REMOVE INSULA-TION & CLEAN	CLEAN & CAP OR REMOVE	MONITOR FOR 10 YEARS	INDUSTRIAL ONLY NO WELLS
ALT 4	CAP > 10 PPM	REMOVE	REMOVE, EXCEPT CONCRETE SLAB	CAP	MONITOR FOR 10 YEARS	INDUSTRIAL ONLY NO WELLS
ALT 5A	CAP > 10 PPM	REMOVE	REMOVE INSULA-TION & CLEAN FRAMEWORK	REMOVE	MONITOR FOR 10 YEARS	INDUSTRIAL ONLY NO WELLS
ALT 5B	REMOVE > 10 PPM	REMOVE	REMOVE INSULA-TION & CLEAN FRAMEWORK	REMOVE	MONITOR FOR 10 YEARS	INDUSTRIAL ONLY NO WELLS
ALT 6	REMOVE > 10 PPM	REMOVE	REMOVE	REMOVE	MONITOR FOR 10 YEARS	UNRESTRICTED EXCEPT NO WELLS

[2]Except for Alternative 1, pond surface water will be removed and treated in all alternatives prior to land application or discharge.

[3]In each capping alternative, soil removal would occur in certain areas where capping is not feasible or practicable and removed soil would be disposed of offsite or placed under the cap.

[4]In each alternative, removal would include disposal either by on- or offsite incineration or offsite landfilling. Sediments would be dewatered prior to disposal.

9.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternative remedial actions were developed to respond to the contamination at the Rose site. The alternatives described in the preceding section were evaluated using criteria related to factors set forth in Section 121 of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nine criteria are described below.

Threshold Criteria:

- Overall Protection of Human Health and the Environment. This criterion addresses whether a remedy provides adequate protection to human health and the environment and describes how risks from each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance With ARARs. This criterion addresses whether a remedy will comply with chemical-specific, action-specific and location-specific ARARs and with other criteria, advisories and guidances (TBCs), or provide grounds for a waiver.

Primary Balancing Criteria:

- Long-Term Effectiveness and Permanence. This criterion refers to the magnitude of residual risk, including the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met, and the adequacy and reliability of engineering and institutional controls.

- Reduction in Toxicity, Mobility, and Volume through Treatment. This criterion assesses the anticipated performance of the treatment technologies that may be employed in a remedy.

- Short-Term Effectiveness. This criterion refers to the speed with which the remedial response objectives are achieved, as well as the remedy's potential to have adverse impacts on human health and the environment during the construction and implementation periods.

- Implementability. This criterion assesses the technical feasibility for constructing and operating a remedy; the technical and administrative reliability of a remedy, including the availability of materials and services needed to implement the chosen remedy; and the ease of undertaking additional response action, if necessary.

- Cost. This criterion includes the capital, operation and maintenance (O&M), and present worth cost of a remedy.

Modifying Criteria:

- State Acceptance. This criterion assesses whether, based on its review of the RI/FS and Proposed Plan, the State concurs, opposes, or declines to comment on the preferred alternative.

- Community Acceptance. This criterion assesses the degree of community acceptance of a remedy. The degree of community acceptance can generally be determined as a result of a review of comments received during the public comment period.

9.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

All of the alternatives, except Alternative 1, protect human health and the environment by either preventing exposure to PCB materials or by removing them. Except for Alternative 1, each of the alternatives includes the removal of PCB sediments from East Pin Oak Creek and its unnamed tributary, thus eliminating that exposure pathway to offsite residents. Alternatives 2 through 6 address the PCB materials remaining onsite by a variety of methods. These methods include complete removal, partial removal, decontamination, capping, institutional controls and fencing.

Alternative 6 provides the greatest overall protection by removing all contaminated materials considered to be a health risk, including: all stream and onsite pond sediments; all soils contaminated with greater than 10 ppm PCBs; and the Main Building and the South Warehouse, including the concrete floor slabs. Under this alternative, PCB-contaminated soil would be excavated and the 10-inch cover of clean soil would be placed over the entire eastern portion of the site, including all excavated areas. Implementation of Alternative 6 eliminates potential risks to human health and the environment through each pathway of exposure, while the other alternatives (except for Alternative 5B) only reduce or control potential risks with respect to one or more pathways of exposure. In addition, when compared to the other alternatives, removal of the contaminated materials under Alternative 6 would to a greater degree reduce the risk of potential degradation of the deep ground water and further degradation of the shallow ground water, which recharges the unnamed tributary on the southwestern portion of the site. Implementation of Alternative 6 reduces the chances that future response actions would be necessary to address recontamination of this tributary or adjoining surface waters.

When compared to Alternative 6, the other alternatives (except Alternative 5B) provide less assurances that risks are eliminated, reduced or controlled. The significant difference between Alternatives 5B and 6 is that the building structures' skin and framework are decontaminated and left onsite under Alternative 5B, while they are removed from the site under Alternative 6. Except for Alternative 5B and 6, the other alternatives allow significant amounts of contaminated materials to remain onsite with either a multimedia cap over site soils or encapsulation of the concrete floors in site buildings. There is the potential for the multimedia cap or encapsulation to fail or to be breached as a result of site activities, thereby creating a potentially unacceptable health hazard.

Except for Alternative 1, human health risks through each pathway are eliminated, reduced or controlled through a combination of the actions specified for each alternative and institutional controls (in the form of deed restrictions). In regard to deed restrictions, the FS indicates that implementation of Alternative 6 would allow future residential use of the site with minor deed restrictions requiring the placement of a minimum 10-inch layer of clean soil beneath and around any structure to be built onsite. EPA has determined that implementation of Alternative 6 would allow the site to be considered a non-restricted access area and no further restrictions on residential development would be required. As for all alternatives, deed restrictions would be required for Alternative 6 prohibiting the installation of shallow ground water wells for purposes other than monitoring. Implementation of Alternatives 3 through 5 would require deed restrictions prohibiting any site activity that would result in the disturbance of the soil cap and/or the building encapsulation. These deed restrictions may allow for restricted access future use of the site if the deed restrictions are complied with, but would not allow future non-restricted use of the site. Implementation of Alternatives 1 and 2 would prohibit any future use of or access to the site.

Alternative 2 provides less human health protection than Alternatives 3 through 6, leaving most of the materials containing PCBs onsite. This alternative does not achieve the point of departure risk levels for a trespasser. In addition, achievement of point of departure risk level for the offsite resident under Alternative 2 is dependent on maintenance of the buildings in a tight, boarded-up condition. Alternative 1 provides no protection to human health, other than deterring site access through fencing.

9.2 COMPLIANCE WITH ARARs

During preparation of the FS, the RCSC conducted a review of federal, state and local laws, regulations and policies to identify potential ARARs. Other criteria or policies to-be-considered (TBC) were also evaluated by the RCSC for application to the site. The RCSC's evaluations of potential chemical-specific, action-specific, and location-specific ARARs and the TBCs are set forth in Appendix B of the FS.

Subsequent to the evaluation of potential ARARs and TBCs in the FS, EPA issued a guidance document, published on August 15, 1990, entitled "Guidance on Remedial Actions for Superfund Sites With PCB Contamination" (OSWER Directive No. 9355.4-01). Along with other criteria and policies, guidance documents are potential TBCs in developing and evaluating alternative remedial actions at Superfund sites. Region VII has determined that this guidance document is a relevant TBC for determining the appropriate disposal method for PCB-contaminated materials at the Rose site. Specifically, this guidance indicates that PCBs in soil and debris at concentrations of 100 ppm or greater at sites in residential areas and PCBs at concentrations of 500 ppm or greater at sites in industrial areas generally will constitute a principal threat. Consistent with NCP expectations, principal threats at Superfund sites should be treated where practicable. Treatment of principal threats can occur onsite or offsite.

The FS states on page B-6 that "Hazardous waste regulations in general are not considered applicable because the concentration of TCLP parameters in site soils to be removed never exceed 20 times the regulatory level of these parameters found in 40 C.F.R. § 261.24 based on all soil analytical data obtained to date." However, of the different media sampled during the RI, it appears that samples of surface soils and building components (floors, walls and ceilings) were only analyzed for PCBs. Therefore, the hazardous waste regulations may be an ARAR if the additional sampling and analysis that must be conducted during the implementation of the selected remedy indicates the presence of hazardous wastes in the various media to be remediated. If this sampling and analysis indicates a contaminant of concern must be considered a hazardous waste, the EPA and State hazardous waste regulations will be ARARs for Site remedial actions. Specific ARARs would include: 1) Federal Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, 40 C.F.R. Part 264, and the equivalent State standards; 2) Federal Standards Applicable to Transporters of Hazardous Wastes, 40 C.F.R. Part 263, and the equivalent State standards; and 3) Federal Land Disposal Restrictions, 40 C.F.R. Part 268.

In addition to the State ARARs identified in the Tables in Appendix B of the FS, the State of Missouri has identified the following chemical-specific and action-specific ARARs: 1) the Missouri Hazardous Waste Management Regulations at 10 C.S.R. Chapter 25, Standards for Transporters of Hazardous Wastes; 2) Missouri Air Quality Standards and Air Pollution Control Regulations at 10 C.S.R. Chapter 10-6; and 3) Missouri Solid Waste Management Regulations at 10 C.S.R. Chapter 80, Standards for Management of Solid Waste Disposal Practices.

Except for Alternative 1, all the alternatives would involve treatment of surface waters. Surface waters requiring treatment under the alternatives include: 1) water generated as a result of sediment removal from the unnamed tributary and East Pin Oak Creek; 2) water from the four storm water and spill containment ponds; and 3) water from the concrete pit in the Main Building. The FS indicates that surface waters involved in response actions would be treated using activated carbon, and then land-applied onsite or discharged to the unnamed tributary or the Holden POTW. Treated water will necessarily have to be sampled prior to discharge to the unnamed tributary or the Holden POTW to ensure compliance with the requirements of the Clean Water Act, its implementing regulations and State of Missouri standards or limitations, including Missouri Water Quality Standards at 10 C.S.R. 20-7.031. The Missouri Department of Natural Resources may establish the specific discharge limitations for treated water during remedial design. If discharge is to the Holden POTW, any pretreatment requirements contained in the City of Holden's city sewer ordinance will have to be met prior to discharge. A permit may be required prior to discharge to area creeks or streams depending upon the discharge point. This determination will be made during remedial design.

Alternative 1 would not meet ARARs or TBCs. Only Alternatives 3B (if the concrete in the buildings is decontaminated or removed and treated to below appropriate levels), 5B and 6, assuming use of the onsite or offsite incineration options, would meet all their respective ARARs or TBCs.

9.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

Among all the alternatives, Alternative 6 provides the most certainty with respect to long-term effectiveness and permanence by removing over 80 percent of the PCBs remaining at the site and placing a soil cover over the entire eastern portion of the site. Under this alternative, the site would be considered a non-restricted access area. Institutional controls, in the form of deed restrictions, prohibiting use of the shallow ground water for purposes other than monitoring will be adequate and reliable.

Alternative 4 provides long-term effectiveness and permanence by controlling exposure to PCBs; removing all above-ground structures; and capping soils, sediments, and exposed concrete slabs. However, the permanence of this alternative is less certain than Alternative 6 because it is dependent upon the maintenance of the soil cap and concrete encapsulation.

Alternatives 3A, 3B, 5A and 5B limit future use of the site to activities that would not disturb or breach the soil cap and/or the building encapsulation because materials containing significant concentrations of PCBs remain onsite. There are more uncertainties associated with the decontamination and encapsulation technologies used in these alternatives to clean the buildings and concrete. There are also uncertainties associated with the potential for the breaching of the soil cap or encapsulated concrete, thereby resulting in potential future exposure to PCBs at levels that may represent an unacceptable human health risk.

Alternatives 5A and 5B both involve cleaning of the buildings and removal of the concrete slabs. With Alternative 5B, only PCB soils with less than 10 ppm total PCBs are left onsite; with Alternative 5A, the PCB soils (greater than 10 ppm) are primarily capped (with selective removal of outlying PCB soils). Consequently, because Alternative 5A leaves PCB-contaminated material onsite with a cap over it, Alternative 5B has greater certainty with respect to long-term effectiveness and permanence than 5A.

Alternatives 3A and 3B are similar to Alternatives 5A and 5B, in that both involve capping or removal of PCB soils and decontamination of the buildings. Alternatives 3A and 3B involve decontamination and encapsulation of the concrete slabs. Alternatives 5A and 5B involve the removal of the concrete slabs and PCB-contaminated soil beneath. Alternatives 3A and 3B have less certainty with respect to long-term effectiveness and permanence than Alternatives 5A and 5B because Alternatives 3A and 3B allow a greater amount of contaminated material to remain onsite.

Alternative 2 would not allow for future access or use of the site because this alternative leaves a significant amount of PCB-contaminated materials (soils and buildings) onsite. Although contaminated site soils above 10 ppm would be capped, the buildings would remain in their current condition, but boarded-up. Thus, the magnitude of the residual risk under this alternative remains significant. The ability of this alternative to maintain reliable protection of human health and the environment is uncertain; therefore, considerable less long-term effectiveness and permanence would result from the implementation of this alternative.

Alternative 1 would not allow for future access or use of the site because this alternative leaves all materials (soils, sediments and buildings) containing PCBs onsite. The magnitude of the residual risk would remain significant. This alternative would not provide protection of human health or the environment.

9.4 REDUCTION IN TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

Except for Alternative 1, all the alternatives provide some level of treatment. Alternatives 2 through 6 treat surface water which is generated during sediment removal (estimated 70,300 gallons) or from onsite ponds (estimated 545,000 gallons) using activated carbon. The activated carbon reduces the volume of contaminated material and reduces the mobility of the PCBs. After the carbon is spent, the carbon filter is regenerated by subjecting the filter to high temperature treatment in which the PCBs are destroyed. Depending upon the level of contaminants that may remain following treatment, the water would be discharged to the unnamed tributary onsite, land-applied onsite, or discharged to the Holden POTW.

Alternatives 2 through 6 also contain the option of disposing of the excavated soils and sediments and other debris by offsite landfilling or incineration (on- or offsite). If incineration is chosen as the treatment method, over 99.9999 percent of PCBs are destroyed. The treatment residual, incinerator ash, may be disposed as a solid waste once it is demonstrated that it is no longer considered to be a hazardous waste. The volume of non-hazardous ash from incinerating soil, concrete, and building materials will be nearly 100 percent of the original volume.

Landfilling of all PCB-contaminated material does not meet the statutory preference for treatment. However, disposal of the PCB materials in a TSCA secure landfill reduces their mobility by isolating the materials from the environment to a greater extent than capping. A TSCA landfill has bottom liners and leachate recovery as well as surficial protection.

9.5 SHORT-TERM EFFECTIVENESS

Protection of the community and site workers during remedial actions, environmental impacts, and the length of time to implement the remedial action objectives are factors that are considered in evaluating the short-term effectiveness of an alternative.

For the Rose site, the short-term effectiveness is dependent upon the level of onsite construction activities and the chosen disposal option. Within each alternative, the choice of treatment/disposal option mainly affects implementation time. The options discussed in the FS can be ranked in order of increasing implementation times as follows: landfilling, onsite incineration, and offsite incineration. In general, an alternative using the offsite landfill disposal option would have greater short-term effectiveness than an alternative with the onsite incineration disposal option, simply because once the material is transported offsite it no longer has any effect at the site. In turn, an alternative with the offsite incineration disposal option could have the least short-term effectiveness because this option may require long-term onsite storage of the PCB material while awaiting incinerator capacity.

The greatest short-term effectiveness is achieved by Alternative 1, since the only response actions that would take place would be: extending the perimeter fence to enclose a portion of the unnamed tributary; the posting of signs; and instituting deed restrictions to prohibit use of the site. These minimal response actions would have no or very little impact on human health and the environment as a result of construction or implementation activities. However, the risk that would remain to human health and the environment would be significant and would not meet remedial action objectives. Among the other alternatives, Alternative 2 provides the next greatest short-term effectiveness since it involves the least amount of activities onsite which could cause dust or vapor emissions and because the time estimated to perform the limited amount of work required is less than the other response action alternatives. During implementation of any of the response action alternatives, control measures would be instituted to mitigate any short-term risk to the community or site workers from dust or vapor emissions. The remaining alternatives have progressively higher short-term health risks associated with them because of their level of construction activities, and the length of time required to carry out the response action. Alternative 6, with the disposal option of incinerating all contaminated material offsite, could afford the least short-term effectiveness because of potential delays in shipping material to the incineration facility due to a lack of capacity at the facility.

9.6 IMPLEMENTABILITY

Alternative 1 is the easiest alternative to implement in that it requires very little construction (boarding-up the building and fencing the site) and is unlikely to be delayed by technical problems. Under this alternative, future response actions would likely be necessary. Present availability of personnel and equipment to implement Alternative 1 would not be a problem.

To remediate the site, the other alternatives use various combinations of conventional excavation and/or demolition technologies and multi-media cap and/or decontamination and encapsulation technologies. In general, the conventional excavation and/or demolition technologies are less difficult to implement. The multi-media soil cap and the decontamination and encapsulation technologies for the buildings and concrete both require specialized equipment and personnel. In addition, the existence of a multi-media cap over site soils would adversely affect the ease of undertaking future response actions, if determined to be necessary. Such future actions could damage the cap.

Alternative 6 utilizes only conventional excavation and demolition technologies to remove site soils and buildings and concrete. Because no multi-media cap or encapsulation is involved, no specialized equipment or techniques are required as would be for encapsulation or membrane placement required by other alternatives. Implementation of Alternative 6 would not unduly restrict the implementation of additional response actions, if necessary. Alternative 6 would be the most desirable alternative with respect to implementability.

Alternative 2 would also be easy to implement in that it involves only conventional excavation technology for the sediment removal. As in Alternative 1, future response actions would likely be required at the site under Alternative 2.

Alternative 4 does not involve decontamination and encapsulation technologies, but does include a multi-media cap over soil and concrete, thereby increasing the difficulty for implementing future response actions, if necessary.

The remaining alternatives each utilize a multi-media cap and/or decontamination and encapsulation technologies making them less desirable from an implementability standpoint.

9.7 COST

Alternative 1 is the least expensive alternative to implement at $81,000. The cost of each of the other alternatives presented is dependant upon which of the three disposal options is chosen for that alternative, either offsite incineration, onsite incineration, or offsite landfilling. According to the FS, offsite incineration is generally 2 to 3 times as expensive as offsite landfilling. Onsite incineration is less expensive than offsite incineration (assuming all material is incinerated), but more expensive than landfilling. The ranking of the lowest cost action alternative within the FS, ranges from the least expensive action alternative, Alternative 2 (offsite landfilling) at $3,600,000, to the most expensive option of Alternative 6 (offsite incineration) at $41,700,000.

The following table represents the total present worth cost of each of the alternatives as presented in the FS, and includes both capital costs and present worth operation and maintenance costs.

ALTERNATIVE	LANDFILL	OFF SITE INCINERATION	ON SITE INCINERATION
1.	$ 81,590	--	--
2.	$3,622,292	$10,063,126	$6,864,869
3A.	$7,195,060	$14,769,378	$10,927,245
3B.	$9,260,037	$22,785,387	$16,064,411
4.	$6,103,745	$14,384,411	$10,451,941
5A.	$8,798,230	$23,411,214	$15,652,807
5B.	$13,193,297	$39,739,152	$26,323,741
6.	$12,558,238	$41,713,063	$25,754,116
6. ASH	HANDLED	ON SITE	$18,296,615

9.8 STATE ACCEPTANCE

MDNR feels residential use should be prohibited at the site.

9.9 COMMUNITY ACCEPTANCE

Community acceptance is specifically addressed in the attached Responsiveness Summary. The Responsiveness Summary provides a thorough review of the significant public comments received on the RI/FS and the Proposed Plan, and EPA's responses to the comments. The community has expressed support for the remedy selected as described in the Proposed Plan.

10.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA and the NCP, the evaluation of the relative performance of each alternative with respect to the nine criteria, and consideration of comments received during the public comment period, EPA has determined that a modified Alternative 6 is the selected remedy. This selected remedy includes: a combination of disposal and treatment methods[5]; deed restrictions prohibiting the installation of shallow ground water wells for purposes other than monitoring; and a minimum ten-year ground water monitoring program. While the selected remedy specifically addresses PCB contamination, EPA has determined, based upon current information, the remedy will also address the VOC contamination identified at the site.

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[5]The treatment technology chosen in this Record of Decision is incineration. Other technologies may be considered in lieu of or in combination with incineration during remedial design if they meet the criteria set forth in this Record of Decision.

Note that prior to the land disposal of any contaminated material, a determination will have to be made as to the applicability of the RCRA land disposal restrictions in 40 C.F.R. Part 268. The selected remedy is more fully described as follows:

- Excavation and offsite disposal of tributary and stream sediments containing PCBs equal to or greater than 0.18 ppm in a TSCA chemical waste landfill. It is not anticipated that any sediment will constitute a principal threat at the Rose site. If it does, it will be disposed of in the same manner as soils deemed to represent a principal threat.

- Excavation and offsite disposal in a TSCA chemical waste landfill of onsite soils containing PCBs at or greater than 10 ppm but not considered to be a principal threat. A minimum of ten inches of soil will be removed from all excavated areas. Post-excavation sampling will be conducted.

- Excavation and offsite incineration at a TSCA approved incinerator of soils that contain PCBs which are considered to represent a principal threat.

- Dismantling of the Main Building and South Warehouse, including floor slabs and insulation, and the offsite disposal in a TSCA chemical waste landfill of the debris which can be demonstrated to be contaminated with less than 2,500 ppm PCBs. The metal components and interior partitions of the buildings that can be decontaminated to below 1 ppm can be salvaged or disposed of as solid wastes.

- Offsite incineration of debris from the building structures that is contaminated in excess of 2,500 ppm PCBs at a TSCA approved incinerator.

- Following post-excavation sampling, backfilling all excavated areas with clean soil and bringing to grade. At a minimum, a 10-inch thick layer of clean material will be placed over all excavated areas.

- Ground water monitoring for a minimum 10-year period, to be extended upon the occurrence of certain events including, but not limited to: analytical data indicating a significant increase in the levels of contamination in the shallow or deep ground water; or analytical data indicating significant fluctuations in contaminant levels between sampling events. The number and location of ground water monitoring wells and the frequency of sampling and analysis will be established in the remedial design work plan.

- Deed restrictions (to be implemented by the current owner of the site property) prohibiting the installation of wells in the shallow ground water for purposes other than monitoring.

The following is an expanded description of the selected remedy in terms of the media affected:

A) STREAM SEDIMENT

All stream sediment contaminated at levels equal to or greater than 0.18 ppm is to be removed and disposed of in an approved TSCA chemical waste landfill.

Once verification sampling confirms that all sediment equal to or greater than 0.18 ppm has been removed, the stream beds will be backfilled with sand and gravel to restore the stream to the previous conditions.

B) SOIL

All site soil having PCBs at levels greater than or equal to 10 ppm will be excavated. Excavation will be a minimum of ten inches. The soil with PCB contamination at or greater than 10 ppm but not constituting a principal threat at the site will be disposed in an approved TSCA chemical waste landfill. Soils containing PCBs which constitute a principal threat will be incinerated.

All areas from which soil is excavated will be covered with at least ten inches of clean fill material. The entire eastern portion of the site will be covered with at least ten inches of clean fill material. This includes all areas east of the western most excavated area.

C) BUILDING STRUCTURES

The Main Building and the South Warehouse will be dismantled and all debris will be removed. All of the materials contaminated at levels eater than 10 $\mu g/100\ cm^2$ will be either disposed of in an approved TSCA chemical waste landfill or decontaminated and sold for scrap. Any material not sent to an approved TSCA chemical waste landfill will be sampled to verify that it is not contaminated prior to being sold as scrap or disposed of as solid waste. The residues of any decontamination process will be disposed of in a manner approved specifically by EPA in accordance with TSCA, RCRA and any other applicable law.

D) CONCRETE SLABS

The concrete slabs supporting the two buildings have been found to be contaminated with PCBs. The concrete slabs will be removed in their entirety. Concrete that is contaminated at levels between 10 and 2,500 ppm will be disposed of in an approved TSCA chemical waste landfill. Concrete contaminated with PCBs in excess of 2,500 ppm will be incinerated.

E) GROUND WATER

A ground water monitoring program will be designed and implemented for the site. Ground water monitoring is a necessary component of the remedy to ensure that the contaminated shallow ground water, which recharges to the unnamed tributary on the southwestern portion of the facility property, does not recontaminate surface waters in the vicinity of the site.

A ten year period will be the base period for which the monitoring plan will be designed and implemented. The ground water monitoring plan will be designed specifically with the purpose of monitoring for any change in the quality of the shallow or deep ground water in the vicinity of the site. Ground water monitoring will be extended beyond ten years upon the occurrence of certain events including, but not limited to: analytical data indicating a significant increase in contaminant levels; or analytical data indicating significant fluctuations in contaminant levels between sampling events. The number and location of the ground water monitoring wells and the frequency of sampling and analysis will be established in the remedial design work plan.

The ground water monitoring plan will include provisions to deal with unexpected contingencies. The major contingencies which can be anticipated, although not expected, are further degradation of the shallow ground water necessitating additional response actions, or contamination being found in the deep ground water. Specific actions appropriate to changed conditions will be incorporated in the ground water monitoring plan. Specific references to actions necessary to respond to conditions which will require stream sediment surface water sampling will be included.

COST AND TIME ESTIMATE

Subsequent to publication of the FS, EPA undertook a survey of offsite incineration facilities to determine the costs of incinerating the PCB-contaminated materials found at the Rose site and to determine the time necessary to incinerate those materials. This survey documents some cost and time estimates at variance with those stated in the FS. Both cost and implementation time varied among incineration facilities. Although there are a number of variables which will influence both the cost and time to implement the selected remedy, EPA has estimated it will cost $13,600,000 and, except for ground water monitoring, take approximately 15 months to complete the remedy. Appendix A contains the general results of the cost analysis for the various disposal options for Alternative 6.

INSTITUTIONAL CONTROLS

The preferred remedy in the Proposed Plan would have required deed restrictions prohibiting the construction of residential structures. However, the PCB Spill Cleanup Policy establishes a cleanup level of 10 ppm for unrestricted access areas, a level that provides risk reduction within the acceptable range established in the NCP. Therefore, since the selected remedy in this Record of Decision would require the excavation and offsite treatment or disposal of all soils contaminated at and above 10 ppm PCBs, EPA has determined that the only deed restriction necessary for this site is to prohibit the installation of shallow ground water wells for purposes other than monitoring.

11.0 STATUTORY DETERMINATIONS

Under its legal authority, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with ARARs unless a statutory waiver is justified. The selected remedial action must also be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatments that permanently and significantly reduce the volume, toxicity, or mobility of the hazardous waste as their principal element. The following subsections discuss how the selected remedy for the Rose site meets these statutory requirements.

11.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy protects human health and the environment through excavation of PCB sediments, PCB soils, removal of the structures and concrete slabs, treatment of highly contaminated materials in an offsite incinerator, and landfilling of moderately contaminated materials.

Removal and treatment of the PCB materials will eliminate the threat of exposure to the contaminants. Implementation of the selected remedy will not pose any unacceptable short-term risks or cross-media impacts to the site, the workers, or the community.

11.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The selected remedy complies with federal and state ARARs. The following subsections describe the ARARs and TBCs which will be met and/or complied with during implementation of the selected remedy.

11.2.1 Action-Specific ARARs

Action-specific ARARs include the following:

- National Primary and Secondary Ambient Air Quality Standards (40 C.F.R. Part 50).
- State Air Quality De Minimis Emission Levels [10 Code of State Regulations (C.S.R.) 6.060(7)(A)].
- PCB Regulations at 40 C.F.R. Part 761.
- RCRA Land Disposal Restrictions at 40 C.F.R. Part 268.
- Clean Water Act and its implementing regulations.
- Missouri Water Quality Standards at 10 C.S.R. 20-7.031.
- City of Holden's sewer ordinance.

These action-specific ARARs will be met by the selected remedy.

11.2.2 Chemical-Specific ARARs

- PCB Regulations at 40 C.F.R. Part 761.

11.2.3 Location-Specific ARARs

No location-specific ARARs have been identified for the site.

11.2.4 Other Criteria, Advisories, or Guidances to be Considered (TBCs) for the Remedial Action

The PCB Spill Cleanup Policy (40 C.F.R. Part 761, Subpart G) and the below-described August 1990 PCB Cleanup Guidance are TBCs for the site and will be met by implementation of the selected remedy.

In August of 1990, the Agency published the "Guidance on Remedial Actions for Superfund Sites With PCB Contamination" (OSWER Directive No. 9355.4-01). This guidance document states that treatment should be considered at Superfund sites for soil and debris contaminated with PCBs which constitute a principal threat. Concrete falls under the category of debris.

In evaluating the statutory preference for treatment in order to achieve permanence and how to address that requirement at the Rose site, the Region was unable to identify the existence of other remedial actions which addressed the disposal of PCB-contaminated concrete similar to the conditions that exist at the Rose site. For the Rose site, strict compliance with the aforementioned August 1990 policy would require treatment of all concrete contaminated with PCBs above 100 ppm, resulting in significant costs when compared to the environmental benefits gained. Therefore, for the Rose site, the Region determined that it would be reasonable to use an analytical approach in determining an appropriate cost effective level of treatment for contaminated concrete.

In conducting the analysis, the Region initially sought current estimates of unit costs for excavating, transporting, and offsite landfilling of all PCB-contaminated materials to be disposed of under the Alternative 6, landfill disposal remedy. Using those costs, an estimate of $12,400,000 was determined to be the reasonable cost to landfill all PCB-contaminated material identified for disposal under Alternative 6. That cost was used as the base cost in completing the following analysis, which describes the additional costs that would be incurred in treating by incineration PCB-contaminated concrete above five different contamination levels. For a detailed breakdown of these estimates, <u>see</u> Appendix A.

- A 5% increase in the base cost ($12,400,000) to $13,000,000 would allow treatment of all concrete contaminated at levels greater than 10,000 ppm PCBs and soils which constitute a principal threat. Under this scenario, 58% of the PCBs contained in the concrete at the site would be treated.

- A 10% increase in the base cost ($12,400,000) to $13,600,000 would allow treatment of all concrete contaminated at levels greater than 2,500 ppm PCBs and soils which constitute a principal threat. Under this scenario, 81% of the PCBs contained in the concrete at the site would be treated.

- A 22.4% increase in the base cost ($12,400,000) to $14,800,000 would allow treatment of all concrete contaminated at levels greater than 1,000 ppm PCBs and soils which constitute a principal threat. Under this scenario, 94.5% of the PCBs contained in the concrete at the site would be treated.

- A 24% increase in the base cost ($12,400,000) to $15,400,000 would allow treatment of all concrete contaminated at levels greater than 500 ppm PCBs and soils which constitute a principal threat. Under this scenario, 97.7% of the PCBs contained in the concrete at the site would be treated.

- In order to treat all contaminated concrete which exceeds 100 ppm PCBs, an increase of over 27% of the base cost ($12,400,000) to $15,800,000 would be required. Under this scenario, 99.7% of the PCBs contained in the concrete as well as the soils which constitute a principal threat would be treated.

Analysis of the above, along with the nine criteria set forth in 40 C.F.R. § 300.430(f) and consideration of the statutory preference for treatment in order to achieve permanence, has resulted in the selection of a disposal option in which all concrete contaminated at levels equal to or greater than 2,500 ppm PCBs and all soil which constitutes a principal threat will be incinerated. Materials falling below these thresholds will be disposed in an appropriate offsite TSCA chemical waste landfill.

11.3 COST-EFFECTIVENESS

The selected alternative is cost-effective because it has been determined to provide overall effectiveness proportional to its cost, estimated at a present worth of $13.6 million. The selected alternative assures a higher degree of certainty and overall protectiveness than the least costly alternative (Alternative 2).

Incineration of the highly contaminated materials will result in a higher degree of long-term effectiveness than that afforded by containment at a TSCA chemical waste landfill.

11.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

EPA believes that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Rose site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, EPA has determined that this selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; and cost. The selected remedy considers the statutory preference for treatment as a principal element, as well as state and community input.

The selected remedy treats and destroys a greater amount of the site contaminants than the other alternatives, through incineration or carbon regeneration, and has fewer residuals requiring disposal in a hazardous waste land disposal facility.

The selected remedy reduces the toxicity, mobility, and volume of contaminated material at the site through treatment as described above. The other proposed alternatives, involving solely the landfill disposal option, provide lesser degrees of toxicity, mobility, and volume reduction.

TABLE 1

SUMMARY OF CHEMICALS DETECTED IN SUBSURFACE SOIL AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration
Acetone	54/132	115	820 µg/kg
Aroclor 1242	50/134	14.4	530 mg/kg
Aroclor 1254/1260	45/134	41.8	1600 mg/kg
Benzene	2/132	29	43 µg/kg
2-Butanone	5/5	17	49 µg/kg
Chlorobenzene	2/132	1250	2400 µg/kg
1,1-Dichloroethane	4/132	19	25 µg/kg
1,1-Dichloroethene	4/132	56	180 µg/kg
Ethylbenzene	11/132	62	410 µg/kg
1-Ethyl-3-methyl benzene	1/1	35	35 µg/kg
gama-Hexachlorocyclohexane	4/132	0.09	0.20 µg/kg
2-Hexanone	2/132	13	19 µg/kg
Methyl ethyl ketone	20/132	58	280 µg/kg
Methylene chloride	67/132	50	480 µg/kg
4-Methyl-2-pentanone	1/132	24	24 µg/kg
Styrene	2/132	9	12 µg/kg
Tetrachloroethene	8/132	446	270 µg/kg
Toluene	11/132	10	37 µg/kg
1,1,1-Trichloroethane	4/132	49	125 µg/kg
Trichloroethene	4/132	420	1500 µg/kg
2,4,4-Trimethyl-1-pentane	1/1	36	36 µg/kg
3,4,4-Trimethyl-2-pentane	1/1	16	16 µg/kg
Xylenes (total)	28/132	198	2800 µg/kg

Notes:

(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between replicate samples.

TABLE 2

SUMMARY OF CHEMICALS DETECTED IN ONSITE SURFACE SOIL AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration
Aroclor 1242	58/64	20.03	440 mg/kg
Aroclor 1254/1260	60/64	34.48	420 mg/kg

Notes:
(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between replicate samples.

TABLE 3

SUMMARY OF CHEMICALS DETECTED IN GROUND WATER AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration	
Acetone	4/103	43	110	µg/L
Aroclor 1242 [3]	2/156	8.15	12.9	µg/L
Aroclor 1254/1260 [3]	3/156	4.33	9.6	µg/L
Bromochloromethane	1/103	51	51	µg/L
Chloroform	8/103	33	130	µg/L
1,1-Dichloroethane	7/103	3609	17000	µg/L
1,1-Dichloroethene	3/103	1280	2200	µg/L
1,2-Dichloroethene	13/103	1013	9200	µg/L
trans-1,3-Dichloropropene	1/103	2400	2400	µg/L
Ethanol	1/1	23	23	µg/L
Ethylbenzene	3/103	3567	4500	µg/L
2-Methoxy-2-methyl-propane	1/1	90	90	µg/L
Methylene chloride	3/103	8338	25000	µg/L
1,1,2,2-Tetrachloroethane	1/103	93	93	µg/L
Tetrachloroethene	9/103	4827	12000	µg/L
Toluene	5/103	17402	49000	µg/L
1,1,1-Trichloroethane	5/103	34540	160000	µg/L
Trichloroethene	16/103	1481	8400	µg/L
Vinyl chloride	1/103	82	82	µg/L
Xylenes (total)	3/103	32000	34000	µg/L

Notes:

(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between replicate samples.

(3) Only ground water samples from sampling rounds three and four were used to determine the average concentrations for PCBs.

(4) Only results of unfiltered samples only are reported. No constituents were detected in filtered samples.

TABLE 4

SUMMARY OF CHEMICALS DETECTED IN SEDIMENT AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration	
Acetone	12/47	91	350	µg/kg
Aroclor 1242	25/47	13.23	98	mg/kg
Aroclor 1254/1260	28/47	19.82	145	mg/kg
Benzene	1/47	5	5	µg/kg
1,3-Butadiene-1-01,acetate	1/1	57	57	µg/kg
Chloromethane	1/47	11	11	µg/kg
2,2-Dimethyl-3-hexene	1/1	74	74	µg/kg
2-Ethyl-1-hexanol	2/2	150	190	µg/kg
3-Heptanone	1/47	31	31	µg/kg
g-Hexachlorocyclohexane	1/47	1.1	1.1	µg/kg
2-Hexanone	1/47	130	130	µg/kg
Methyl ethyl ketone	1/47	30	30	µg/kg
Methylene chloride	15/47	95	730	µg/kg
5-Methyl-1-heptene	1/1	79	79	µg/kg
4-Methyl-2-pentanone	1/47	6	6	µg/kg
Morphinan, 7-8-didehydri-3-methoxy-17-methyl-6-methylene	1/1	17	17	µg/kg
3-Octene	1/1	22	22	µg/kg
Pentachlorobenzene	1/1	0.1	0.1	mg/kg
1,2,4,5-Tetrachlorobenzene	1/1	0.3	0.3	mg/kg
Tetrachloroethene	1/47	6	6	µg/kg
1,2,4-Trichlorobenzene	1/1	0.1	0.1	mg/kg
Trichloroethene	13/47	17	53	µg/kg
Toluene	11/47	2247	11000	µg/kg
Xylenes (total)	5/47	584	1800	µg/kg

Notes:

(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between replicate samples.

TABLE 5

SUMMARY OF CHEMICALS DETECTED IN SURFACE WATER AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration	
FILTERED SAMPLES				
Acetone	1/1	13	13	µg/kg
Aroclor 1242	2/9	3.1	4.9	mg/kg
Aroclor 1254/1260	1/9	1.6	1.6	mg/kg
UNFILTERED SAMPLES				
Acetone	4/12	31	45	µg/kg
Aroclor 1242	8/12	5.0	21	mg/kg
Aroclor 1254/1260	7/12	3.4	6	mg/kg
Chlorobenzene	1/12	5	5	µg/kg
1,1-Dichloroethane	2/12	26	26	µg/kg
1,1-Dichloroethene	3/12	45	68	µg/kg
Ethanol	1/1	16	16	µg/kg
Methyl ethyl ketone	1/12	7	7	µg/kg
Methylene chloride	2/12	20	20	µg/kg
1,2,4,5-Tetrachlorobenzene	3/12	207	230	µg/kg
Tetrachloroethene	1/12	8	8	µg/kg
Toluene	4/12	6	8	µg/kg
1,2,4-Trichlorobenzene	3/12	303	410	µg/kg
1,1,1-Trichloroethane	3/12	342	490	µg/kg
1,1,2-Trichloroethane	2/12	109	140	µg/kg
Trichloroethene	1/12	9	9	µg/kg
Xylenes (total)	2/12	12	12	µg/kg

Notes:

(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between replicate samples.

TABLE 6

SUMMARY OF CHEMICALS DETECTED IN THE BUILDINGS AND STRUCTURES INVESTIGATION AT THE MARTHA C. ROSE CHEMICALS, INC. SITE

Constituent	Frequency of Detection[1]	Average Concentration[2]	Maximum Concentration
FLOOR WIPE SAMPLES - Biased			
Aroclor 1242	13/13	82764	970000 µg/100 sq.cm.
Aroclor 1254/1260	13/13	47194	400000 µg/100 sq.cm.
FLOOR WIPE SAMPLES - Unbiased			
Aroclor 1242	37/43	235.6	1700 µg/100 sq.cm.
Aroclor 1254/1260	40/43	316.7	3200 µg/100 sq.cm.
INTERIOR WALL WIPE SAMPLES - Biased			
Aroclor 1242	11/12	129.0	990 µg/100 sq.cm.
Aroclor 1254/1260	9/12	374.4	2400 µg/100 sq.cm.
INTERIOR WALL WIPE SAMPLES - Unbiased			
Aroclor 1242	34/46	23.5	190 µg/100 sq.cm.
Aroclor 1254/1260	34/46	25.0	160 µg/100 sq.cm.
HORIZONTAL SURFACE WIPE SAMPLES - Biased			
Aroclor 1242	11/13	25.1	120 µg/100 sq.cm.
Aroclor 1254/1260	11/13	34.4	120 µg/100 sq.cm.
HORIZONTAL SURFACE WIPE SAMPLES - Unbiased			
Aroclor 1242	17/17	46.8	300 µg/100 sq.cm.
Aroclor 1254/1260	16/17	73.5	530 µg/100 sq.cm.
CEILING WIPE SAMPLES			
Aroclor 1242	15/17	12.8	75 µg/100 sq.cm.
Aroclor 1254/1260	13/17	5.4	21 µg/100 sq.cm.
EXTERIOR WIPE SAMPLES - Biased			
Aroclor 1242	0/12	NA	NA µg/100 sq.cm.
Aroclor 1254/1260	6/12	3.3	4.8 µg/100 sq.cm.
EXTERIOR WIPE SAMPLES - Unbiased			
Aroclor 1242	3/19	8.6	15 µg/100 sq.cm.
Aroclor 1254/1260	11/19	4.4	6.8 µg/100 sq.cm.
INSULATION SAMPLES - Biased			
Aroclor 1242	13/13	464	3400 µg/sample
Aroclor 1254/1260	13/13	383	1700 µg/sample
INSULATION SAMPLES - Unbiased			
Aroclor 1242	22/23	1896	22000 µg/sample
Aroclor 1254/1260	22/23	958	3800 µg/sample
DESTRUCTIVE SAMPLES			
Aroclor 1242	7/7	1740.3	7300 µg/sample
Aroclor 1254/1260	7/7	1681.6	9300 µg/sample

Notes:

(1) Number of samples in which constituent was detected/number of samples for which constituent was analyzed.

(2) Average concentration is calculated using only samples in which the constituent was detected and the highest value between collected or replicate samples.

TABLE 7

TOXICITY PARAMETERS FOR THE ROSE SITE INDICATOR CHEMICALS[a]

Indicator Chemical	CPF - oral $(mg/kg/day)^{-1}$	CPF - inhalation $(mg/kg/day)^{-1}$	RfD - oral (mg/kg/day)	RfD-inhalation (mg/kg/day)
Aroclor 1242	7.7	7.7[b]	0.0001[c]	0.0001[d]
Aroclor 1254/1260	7.7	7.7[b]	0.0001[c]	0.0001[d]
1,1-Dichloroethane	0.091	--	0.1	0.1
1,1-Dichloroethene	0.6	1.2	0.009	--
g-Hexachlorocyclohexane[e]	1.3	1.3	0.0003	0.0003
Methylene chloride	0.0075	0.014	0.06	0.06
Tetrachloro-ethylene	0.051	0.0033	0.01	--
Toluene	--	--	0.3	1.0
1,2,4-Trichlorobenzene	--	--	0.02	0.003
1,1,1-Trichloroethane	--	--	0.09	0.3
Trichloroethylene	0.011	0.013	--	--

Notes:

a Except where noted, toxicity parameters are from USEPA Health Effects Assessment Summary Tables updated March 1989.

Oral CPFs and RfDs were used for estimating risks associated with dermal exposure to the indicator chemicals, with adjustment for the lower rate of absorption by the dermal route.

b The USEPA has derived a CPF for PCBs for the oral route of exposure only. The oral route CPF was also used for estimating risks associated with the oral inhalation route. Differences in absorption between the oral and inhalation routes are taken into account in the equations for estimating the absorbed dose of PCBs.

c Value obtained from Drinking Water Criteria Document for Polychlorinated Biphenyls, USEPA, 1989.

d The USEPA has derived an RfD for PCBs for the oral route of exposure only. The oral route RfD was also used for estimating risks associated with the oral inhalation route. Differences in absorption between the oral and inhalation routes are taken into account in the equations for estimating the absorbed dose of PCBs.

e Routes of exposure for both the CPF and RfD for g-hexachlorocyclohexane (lindane) are unspecified by the USEPA.

TABLE 8

SUMMARY OF POTENTIAL EXPOSURE PATHWAYS

Pathway	Current Use/ No Action Onsite Trespasser	Current Use/ No Action Offsite Resident	Future Use/ Industrial Development Onsite Worker[a]	Future Use/ Residential Development Onsite Resident
Inhalation of Vapors • Exterior • Interior of Buildings	X	X	-	X
Inhalation of Particulates	X	X	-	X
Dermal Contact with Soil	X	X	-	X
Ingestion of Soil	X	X[b]	-	X[b]
Ingestion of Vegetables	-	X	-	X
Ingestion of Beef [c]	-	X	-	-[i]
Ingestion of Sediments	X[d]	X[e]	-	-[h,i]
Dermal Contact with Surface Water	X[d]	X[e]	-	-[h,i]
Dermal Contact with Sediments	X[d]	X[e]	-	-[h,i]
Ingestion of Ground Water	-	-[f]	-[f]	-[f]
Exposures in Buildings • Inhalation of Vapors • Dermal Contact with Surfaces	X	-	X[g]	-[h]

Notes:

a Worker expected to spend majority of work day indoors.

b Child modeled in addition to adult.

c Cattle exposed through sediments, soils, water, and air in the vicinity of East Pin Oak Creek and its tributary.

d Contact with onsite ponds by wading while trespassing.

e Exposure of children and teenagers to East Pin Oak Creek and its tributary while playing.

f Perched water-bearing subsurface units are not considered viable sources of drinking water.

g Assumes no cleanup or major renovation of the interior of the buildings in the future.

h Assumes buildings, slabs, and ponds are removed.

i Potential exposure from these pathways for the onsite resident are assumed equivalent to the offsite resident.

TABLE 9

SUMMARY OF EXCESS UPPER-BOUND LIFETIME CANCER RISKS FOR TYPICAL CASE

Pathway	No Action[a] (Current Use)		Industrial Development	Residential[c] Development
	Offsite Resident	Onsite Trespasser	Onsite Worker	Onsite Resident
Soil ingestion (Adult)	1.0×10^{-7}	4.3×10^{-8}		2.5×10^{-7}
Soil ingestion (Child)	1.5×10^{-6}			3.7×10^{-6}
Soil, dermal	9.9×10^{-8}	8.2×10^{-8}		2.5×10^{-7}
Wading, dermal	6.9×10^{-7}	1.0×10^{-6}		6.9×10^{-7}
Particulate inhalation	2.2×10^{-8}	2.1×10^{-10}		1.9×10^{-8}
Vapor, inhalation, outdoor	1.0×10^{-5}	9.9×10^{-8}	1.5×10^{-7}[d]	
Vapor, inhalation, indoor, new building			7.0×10^{-6}[e]	6.2×10^{-5}
Beef, ingestion	1.3×10^{-4}			1.3×10^{-4}
Vegetable, ingestion	2.4×10^{-6}			5.5×10^{-6}
Sediment, ingestion	7.7×10^{-7}	2.0×10^{-7}		7.7×10^{-7}
Sediment, dermal	1.8×10^{-6}	4.6×10^{-7}		1.8×10^{-6}
Existing buildings, vapor inhalation		1.6×10^{-5}	3.8×10^{-3}[b]	
Existing buildings, floor, dermal		6.0×10^{-5}	1.7×10^{-3}[b]	
Existing buildings, wall, dermal		1.7×10^{-6}	4.9×10^{-5}[b]	

Notes:

a Assumes no changes to current site conditions.

b Assumes existing buildings (without cleanup) are used by future worker who spends majority of work day indoors.

c Assumes that only buildings, concrete, and ponds are removed.

d Assumes existing buildings are removed and PCB soils > 10 ppm and existing concrete slabs are capped.

e Assumes use of a warehouse type building with a 20-foot ceiling and a ventilation rate of 1 air change per hour.

TABLE 10

SUMMARY OF MDD/RfD RATIOS FOR NON-CARCINOGENIC EFFECTS FOR TYPICAL CASE

Pathway	No Action[a] (Current Use)		Industrial Development	Residential[c] Development
	Offsite Resident	Onsite Trespasser	Onsite Worker	Onsite Resident
Soil ingestion (Adult)	7.6×10^{-3}	2.8×10^{-2}		1.9×10^{-2}
Soil ingestion (Child)	7.4×10^{-2}			1.8×10^{-1}
Soil, dermal	7.5×10^{-3}	4.5×10^{-1}		1.9×10^{-2}
Wading, dermal	8.2×10^{-2}	5.1×10^{-1}		8.2×10^{-2}
Particulate inhalation	2.4×10^{-4}	5.9×10^{-5}		2.0×10^{-4}
Vapor, inhalation, outdoor	4.5×10^{-1}	1.2×10^{-1}	2.2×10^{-3}[d]	
Vapor, inhalation, indoor, new building				$1.4 \times 10^{+1}$
Beef, ingestion	1.4			1.4
Vegetable, ingestion	2.6×10^{-2}			5.9×10^{-2}
Sediment, ingestion	1.1×10^{-1}	1.3×10^{-1}		1.1×10^{-1}
Sediment, dermal	2.3×10^{-1}	2.7×10^{-1}		2.3×10^{-1}
Existing building, vapor inhalation		8.8	$5.4 \times 10^{+1}$[b]	
Existing building, floor, dermal		$3.1 \times 10^{+1}$	$2.4 \times 10^{+1}$[b]	
Existing building, wall, dermal		8.7×10^{-1}	6.9×10^{-1}[b]	

Notes:

a Assumes no changes to current site conditions.

b Assumes existing buildings (without cleanup) are used by future worker who spends majority of work day indoors.

c Assumes that only buildings, concrete, and ponds are removed.

d Assumes existing buildings are removed and PCB soils > 10 ppm and existing concrete slabs are capped.

GLOSSARY

Specialized terms used elsewhere in this Proposed Plan are defined below:

activated carbon - Absorbent material used in water treatment to remove organic contaminants.

Applicable or Relevant and Appropriate Requirements (ARARs) - The federal and state requirements that a contaminant concentration or remedy must attain. These requirements may vary between sites and alternatives.

"delisting" - The formal process of declaring a material no longer hazardous following treatment.

encapsulation - Application of an impermeable sealant to immobilize contaminants.

ground water - Underground water that fills pores in soils or openings in rocks to the point of saturation. Unlike surface water, ground water cannot clean itself by exposure to sun or filtration. Ground water is often used as a source of drinking water via municipal or domestic wells.

incineration - High temperature burning of materials to destroy hazardous compounds.

intermittent tributary - Small creek which does not contain water year-round.

polychlorinated biphenyls (PCBs) - Chemicals used for their thermal stability and non-flammability as an electric fluid in electrical capacitors and transformers.

potentially responsible party (PRP) - Defined under Section 107(a) of CERCLA. PRPs include current and past owners and operators, as well as persons who arranged for the transport, treatment, or disposal, of hazardous substances.

present worth - Present worth is the amount of capital required to be deposited at the present time at a given interest rate to yield the total amount necessary to pay for initial construction costs and future expenditures. Present worth analysis provides a method of evaluating and comparing costs that occur over different time periods (such as operation and maintenance) by discounting all future expenditures to the present year.

volatile organic compounds (VOCs) - Organic compounds that vaporize easily. Some VOCs have been shown to cause leukemia, some are toxic to the kidney and liver; and some depress the Central Nervous System, causing drowsiness.

APPENDIX A

EPA

COST ESTIMATES

INCINERATION DISPOSAL OPTIONS

A. OFFSITE INCINERATION

SOIL PRINCIPAL THREAT **CONCRETE > 100 PPM**

VOLUMES

SOIL

PRINCIPAL THREAT = 227 TONS	13 TRUCKS
>10 < PRINCIPAL THREAT = 8176 TONS	454 TRUCKS

CONCRETE

>100 PPM = 3330 TONS	185 TRUCKS
<100 PPM = 1170 TONS	65 TRUCKS

COST ESTIMATE

LANDFILL 110 $/TON (8176 + 1170) = $ 1,028,060

TRANSPORTATION 3.5 (1535) (454 + 65) = $ 2,788,328

INCINERATE 1500 $/TON (227 + 3330) = $ 4,654,500

TRANSPORTATION 3.5 (200) (13 + 185) = $ 138,600

SUBTOTAL......................... $ 8,609,488

TOTAL = 8,609,488 + BASE COST(7,161,919) = $ 15,771,407

<u>$ 15,800,000</u>

B. OFFSITE INCINERATION

SOIL PRINCIPAL THREAT **CONCRETE > 500 PPM**

VOLUMES

SOIL

PRINCIPAL THREAT = 227 TONS	13 TRUCKS
>10 < PRINCIPAL THREAT = 8176 TONS	454 TRUCKS

CONCRETE

>500 PPM = 2430 TONS	135 TRUCKS
<500 PPM = 2070 TONS	115 TRUCKS

COST ESTIMATE

LANDFILL 110 $/TON (8176 + 2070) = $ 1,127,060

TRANSPORTATION 3.5(1535) (454 + 115) = $ 3,056,953

INCINERATION 1500 $/TON (227 + 2430) = $ 3,985,500

TRANSPORTATION 3.5 (200) (13 + 135) = $ 103,600

SUBTOTAL = ...$ 8,273,113

TOTAL = 8,273,113 + BASE COST (7,161,919) = $ 15,435,032

$15,400,000

C. OFFSITE INCINERATION

SOIL PRINCIPAL THREAT **CONCRETE > 1000 PPM**

VOLUMES

SOIL

PRINCIPAL THREAT = 227 TONS	13 TRUCKS
>10 < PRINCIPAL THREAT = 8176 TONS	454 TRUCKS

CONCRETE

> 1000 PPM = 1845 TONS	103 TRUCKS
< 1000 PPM = 2655 TONS	148 TRUCKS

COST ESTIMATE

LANDFILL 110 $/TON (8176 + 2655) = $ 1,191,410

TRANSPORTATION 3.5 (1535) (454 + 148) = $ 3,234,245

INCINERATION 1500 $/TON (227 + 1845) = $ 3,108,000

TRANSPORTATION 3.5 (200) (13 + 103) = $ 88,200

SUBTOTAL................................$ 7,621,855

TOTAL = 7,621,855 + BASE COST(7,161,919) = $ 14,783,744

$ 14,800,000

D. OFFSITE INCINERATION

SOIL PRINCIPAL THREAT **CONCRETE >2500 PPM**

VOLUMES

SOIL

PRINCIPAL THREAT = 227 TONS	13 TRUCKS
>10 < PRINCIPAL THREAT = 8176 TONS	454 TRUCKS

CONCRETE

>2500 PPM = 810 TONS	45 TRUCKS
<2500 PPM = 3690 TONS	205 TRUCKS

COST ESTIMATE

LANDFILL 110 $/TON (8176 + 3690) = $ 1,305,260

TRANSPORTATION 3.5 (1535) (454+ 205) = $ 3,540,478

INCINERATION 1500 $/TON (227 + 810) = $ 1,555,500

TRANSPORTATION 3.5 (200) (13 + 45) = $ 40,600

SUBTOTAL ....$ 6,441,838

TOTAL = 6,441,838 + BASE COST (7,161,919) = $ 13,603,756

$ 13,600,000

E. OFFSITE INCINERATION

SOIL PRINCIPAL THREAT **CONCRETE >10,000 PPM**

VOLUMES

SOIL

PRINCIPAL THREAT = 227 TONS 13 TRUCKS

>10 < PRINCIPAL THREAT = 8176 TONS 454 TRUCKS

CONCRETE

>10,000 PPM = 315 TONS 18 TRUCKS

<10,000 PPM = 4185 TONS 232 TRUCKS

COST ESTIMATE

LANDFILL 110 $/TON (8176 + 4185) = $ 1,359,710

TRANSPORTATION 3.5 (1535) (454 + 232) = $ 3,685,535

INCINERATION 1500 $/TON (227 + 315) = $ 813,000

TRANSPORTATION 3.5 (200) (13 + 18) = $ 21,700

SUBTOTAL ....$ 5,879,945

TOTAL = 5,879.945 + BASE COST (7,161,919) = $ 13,041,864

$ 13,000,000

APPENDIX B

RESPONSE LETTER

ON ARARS

STATE OF MISSOURI

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

March 12, 1991

RECEIVED
MAR 15 1991
REML SECTION

Mr. Steven E. Kinser
U.S. Environmental Protection
Agency, Region VII
726 Minnesota Avenue
Kansas City, KS 66101

Dear Mr. Kinser:

As requested in your March 1, 1991 correspondence, the Missouri Department of Natural Resources (MDNR) has again reviewed the description of the conditions at the Martha C. Rose Chemicals Inc. site as presented in the Remedial Investigation and Feasibility Study (RI/FS). This review was completed by the staff from the Division of Geology and Land Survey and the Division of Environmental Quality's Waste Management and Water Pollution Control Programs. The following determinations have been made regarding identification of State Applicable or Relevant and Appropriate Requirements (ARARs) as they relate to the groundwater at the Rose Chemicals site:

1. The shallow groundwater at this site is not a "usable" aquifer for the following reasons:

   Depth of contamination is limited to groundwater above a shale bedrock;

   This shale bedrock exhibits a low permeability and reduces the possibility of contaminants migrating vertically into the deeper, usable aquifer; and

   Missouri water well laws render the shallow groundwater unusable because of minimum casing lengths.

   Collectively, these criteria restrict the contamination to a finite, unusable zone of groundwater.

2. The groundwater at depth, in a more permeable stratum and obtainable by water well laws, would constitute a usable aquifer. However, the RI determined that the contamination was limited in depth and has not migrated into this lower groundwater system ("No

VOCs were detected in samples obtained from any deep well"). No State ARARs were identified for this aquifer, since it is not impacted and, therefore, would not affect the Remedial Action.

3. The discharge of the shallow groundwater into the surface water, as stated in the Risk Assessment (RA), poses some risk attributed to specific usage of that surface water, i.e., beef cattle drinking the water and then being consumed by human populations. Only classified streams are meant to be protected as a long-term source of drinking water for livestock. The Standard's General Criteria prohibit acute toxicity to livestock in unclassified waters, but unclassified waters are not believed to provide a continuous water supply. Bioaccumulation above FDA action levels caused by beef drinking from any waters of the State should be considered an exceedence of the Standard's criteria, however, "...waters... must be free from substances [having] a harmful effect on human life."

   The projected worst case for PCB accumulation is 2-5 ppm; the FDA action level for red meat is 3ppm. With the conservative assumptions made, however, the risk of accumulation to this level would seem to be low.

   The classified stream begins about 2 miles below the Rose Chemicals site. Most of the contaminated sediments are in the first 1/4 mile.

   PCB water concentrations in the 1-2 ppb range at "downstream" locations would seem to be in exceedence of the extremely low allowable concentrations of PCBs in classified streams (for protection of human health-fish consumption), if some locations are in the classified part of the stream. However, MDNR does not believe these waters to be a productive sport fishing area, which would yield enough fish over a 70 year period to cause a human health concern.

   One additional general comment should be included in this response. In the Rose Chemicals site FS, appendix B, page B-2, second paragraph, a reference is made to MDNR's "guidance policy" that aquifers must show minimum yields of 5-10 gpm or have significant impacts on stream recharge. The "guidance policy" referred to was established for underground storage tank removal actions and does not set the standard or authority by which all aquifers in the State of Missouri are definitively determined.

   Enclosed is a list of State of Missouri ARARs or potential ARARs that have been identified for the Rose Chemicals site. For your information, I have also attached an updated table for the Rose site's "Indicator Chemicals" as per the recently revised Missouri Water Quality Standards criteria.

Mr. Steven E. Kinser
March 12, 1991
Page Three

I trust this information adequately addresses the issues you requested responses to. If you require additional clarification or desire further discussion of these issues, please do not hesitate to call.

Sincerely,

WASTE MANAGEMENT PROGRAM

Robert Geller

Robert Geller, Chief
Project Management Unit
Superfund Section

RG:jkp

c: Jim Fels, DGLS
John Howland, WPCP

STATE ACTION-SPECIFIC ARARS
MARTHA C. ROSE CHEMICAL, INC. SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	COMMENTS
Missouri Hazardous Waste Management Regulations	10 CSR 25-10.010	Procedures for obtaining State approval for remedial actions at abandoned or uncontrolled sites.	The requirements may be applicable for the Rose Chemical site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-13.010	Standards for management of waste materials or waste manufactured items containing PCBs at concentrations of fifty parts per million or more.	These standards may be applicable/relevant and appropriate requirements for the Rose Chemical site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-6.263	Standards for Transporters of Hazardous Waste.	These requirements may be applicable for the Rose Chemical site if removal offsite of hazardous waste or PCB material.
Missouri Air Quality Standards and Air Pollution Control Regulations.	10 CSR 10-6.	Air Quality Standards and Air Pollution Control Regulations for the State of Missouri.	These requirements may be applicable for the Rose Chemical site if onsite incineration is involved as a remedial action.
Missouri Solid Waste Management Regulations	10 CSR 80	Standards for management of Solid Waste disposal practices.	These requirements may be applicable for the Rose Chemical site if remedial action involves disposal of solid waste in Missouri landfills.

STATE LOCATION-SPECIFIC ARARS
MARTHA C. ROSE CHEMICAL, INC. SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	COMMENTS
Missouri Water Quality Standards	10 CSR 20-7.031	Promulgates rules to protect quality of rivers, lakes, streams, and other surface and subsurface waters of the state. Beneficial use of East Pin Oak Creek and its tributary lists livestock watering.	This requirement may be relevant and appropriate for the Rose Chemical site.

STATE CHEMICAL-SPECIFIC ARARS
MARTHA C. ROSE CHEMICAL, INC. SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	COMMENTS
Missouri Safe Drinking Water Act and Missouri Water Quality	10 CSR 20-7.031	Maximum chemical contaminant levels and monitoring requirements	The requirements may be relevant and appropriate for the Rose Chemical site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-10.010	Procedures for obtaining state approval for remedial actions at abandoned or uncontrolled sites.	The requirements may applicable for the Rose Chemical site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-13.010	Standards for management of waste materials or waste manufactured items containing PCBs at concentrations of fifty parts per million or more.	These standards may be applicable or relevant and appropriate requirements for the Rose Chemical site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-6.263	Standards for Transporters of Hazardous Waste and PCB's	These requirements may be applicable for the Rose Chemical site if removal offsite of hazardous waste or PCB material.

MISSOURI WATER QUALITY STANDARDS (4)

Indicator Chemicals	Human Health Fish Consumption (mg/L)	Drinking Water (mg/L)	Ground Water (mg/L)	Livestock/ Wildlife Watering (mg/L)
Aroclor 1242/1254/1260	4.5E-08	--	4.5E-08	--
Dichloroethane, 1,1-	--	--	--	--
Dichloroethylene, 1,1-	.0032	0.007	0.007	--
Hexachlorocyclohexane, g-	6.20E-05	2.20E-06	2.20E-06	--
Methylene Chloride	1.6	.0047	.0047	--
Tetrachloroethylene	.009	8.00E-04	8.00E-04	--
Toluene	300	10	10	--
Trichlorobenzene, 1,2,4-	--	--	--	--
Trichloroethane, 1,1,1-	--	0.2	0.2	--
Trichloroethylene	.08	.005	.005	--

(--) No potential ARAR identified.

4) Missouri Water Quality Standards are focused in 10 CSR 20-7.031, Effective March 1991.

APPENDIX C

<u>RESPONSIVENESS SUMMARY</u>

<u>RECORD OF DECISION</u>

<u>MARTHA C. ROSE CHEMICALS SITE</u>

MARCH 1992

INTRODUCTION

The purpose of this responsiveness summary is to present the significant comments received during the public comment period on the Proposed Plan and to respond to those comments and how they affected the preparation of the Record of Decision (ROD).

The Proposed Plan and the Administrative Record were made available to the public on or before June 20, 1991 in the City Offices of Holden and the Superfund Records Center in EPA's Region VII offices in Kansas City, Kansas. The public comment period was scheduled tc be open between June 20, 1991 and July 27, 1991. A public hearing was scheduled and held on July 11, 1991. Subsequent to the public hearing, a request was received to extend the public comment period. Accordingly, the public comment period was extended to August 27, 1991.

SOURCE OF COMMENTS

Public Comments were received verbally during the public hearing and written comments were received during the public comment period.

A copy of the transcript of the public hearing and a copy of the written comments received will be placed in the Administrative Record for the site. The content of the significant comments and EPA's response is contained in the next section of this summary.

SUMMARY OF COMMENTS FROM THE PUBLIC HEARING AND EPA'S RESPONSE

The following is a summary of the significant comments received during the public hearing. After each comment is a summary of EPA's response provided at the meeting.

1. Comment:

What is the potential for retaining the buildings on site and making them safe for future use?

EPA's Response:

The current condition of the buildings would require extensive and very expensive repairs before they would again be usable. In addition, the difficulties and uncertainties involved in cleaning the buildings to remove the PCB contamination, especially from the concrete slabs, may make it impossible to reuse the buildings. EPA has concluded that it is not economically feasible to clean the buildings for future use.

2. <u>Comment</u>:

Is there any provision under the Superfund law whereby the responsible parties could be charged with the expense of replacing the buildings?

<u>EPA's Response</u>:

The Region does not believe the Superfund law provides EPA with authority to require responsible parties to replace the buildings once the contaminated materials have been removed.

3. <u>Comment</u>:

What is the relationship between cost effective and cost benefit?

<u>EPA's Response</u>:

It is difficult to determine a cost benefit for public health. Therefore, cost benefit in terms of public health is not used in selecting a preferred remedy. However, in selecting the appropriate remedial action, EPA is required to evaluate the alternative remedial actions in light of the nine criteria listed in 40 C.F.R. § 300.430(e)(2)(iii) of the NCP. In this evaluation, the cost of the remedial action is balanced against other factors including the level of protection of human health and the environment.

4. <u>Comment</u>:

The City of Holden prefers that all of the material at the site be removed from Holden. The city expressed no opinion concerning incineration or landfilling the material once it was removed from Holden.

<u>EPA's Response</u>:

EPA appreciates the City's input and agrees. Removal of PCB-contaminated material is reflected in the Proposed Plan and the Record of Decision.

5. <u>Comment</u>:

How much effort would be required to remove dirt from the creek and exactly how much dirt would be removed?

EPA's Response:

No exact volumetric estimates are possible, but all of the sediment will most likely be removed from the creek. In terms of cost, it will probably be more cost effective to remove all of the sediment rather than conducting the extensive sampling that would be necessary to identify the sediment that would have to be removed and which could remain. Once the sediment is removed, the creek will be backfilled with clean soil/fill material to its original configuration.

6. Comment:

What is the potential for erosion once the backfill for the Creek excavation has been completed?

EPA's Response:

Appropriate materials and compaction techniques will be required to ensure that the restoration of the creek, after removal of contaminated sediment, will be sufficient to ensure against future erosion.

SUMMARY OF WRITTEN COMMENTS AND EPA'S RESPONSE

7. Comment:

Commentator recommended Alternative 6 for the Martha C. Rose Chemicals Site.

EPA's Response:

Alternative 6, with some variation in the disposal/treatment method, deed restrictions and ground water monitoring, was the preferred remedy in the Proposed Plan for Remedial Action and is the selected remedy in the Record of Decision.

8. Comment:

Commentator stated that "On August 13, 1991 the Holden City Council voted to request that the EPA take all the material from the Martha C. Rose Chemicals site that can be landfilled without previously incinerating it, directly to a landfill. The Holden City Council believes that in the interests of expediency, the EPA should authorize the direct landfilling of all possible materials. We understand that there may be some 'hot' spots that would require incineration first, but feel that the bulk of the material could be taken directly to an approved landfill."

EPA's Response:

The plan calls for all materials contaminated at levels of PCB's in excess of health based levels to be removed from the site. The plan further requires the incineration of only those materials which represent a principal threat. EPA believes that incineration of certain contaminated materials will not significantly increase the time necessary to complete the remedial actions for the site.

The remaining comments are from a three page letter accompanied by a 'Detailed Statement' which is twenty-six (26) pages in length. These comments encompassed and expanded upon the comments presented at the public hearing; therefore, the following EPA responses also address the verbal comments presented at the public hearing. Due to the detailed and complex nature of the comments, they will be addressed item by item as they appear in the correspondence. Where possible, references to previous comments will be included to avoid redundancy. Every effort has been made to address all significant issues.

9. Comment:

> "First, Region VII's selection of Alternative 6 as the basic component of the proposed remedy finds no support in the Feasibility Study and is not justified by the Proposed Plan. When the criteria for remedy selection found in CERCLA and the National Contingency Plan ("NCP") are applied, Alternative 6 does not emerge as the preferred remedy. Instead, Alternative 4 is the more rational choice. ..."

In summary, the commentator believes Alternative 4 is a better choice because Alternative 4 and Alternative 6 both achieve the same level of risk reduction and are equally effective with respect to long-term effectiveness, Alternative 4 costs half of what Alternative 6 costs and is superior to Alternative 6 in terms of short-term effectiveness.

EPA's Response:

EPA does not agree with all of the conclusions contained in the FS which was prepared by the RCSC, and specifically disagrees with the conclusion that Alternative 4 is the rational choice of all the alternatives after the nine criteria are evaluated with respect to each alternative. EPA believes the selection of Alternative 6 as the basic component of the remedy is in fact supported by the FS. The basic differences between Alternatives 4 and 6 are summarized in the FS, Page V-92:

> "The above analysis narrows the potential alternatives to 6 and 4. Both remove the off- and on-site sediment and the buildings. Alternative 4 caps the PCB soils and the concrete; Alternative 6 removes them, with an option for incineration followed by replacing the treated material on site. Both provide for future use. Alternative 6 has fewer restrictions, while Alternative 4 provides for industrial development only. In essence, Alternative 4 secures the PCBs on-site while Alternative 6 removes and treats or landfills them. Alternative 4 has more long-term maintenance requirements; however, it creates lower potential short-term health risks and costs 60 percent less than Alternative 6. Both protect human health and the environment and provide long-term effectiveness and permanence."

EPA's specific responses to commentator's evaluation of the criteria are set forth in the responses to comments 10-13, 17, 19, 21 and 23. Generally, EPA has determined that the short-term effects are overstated in the FS and in fact are negligible. The additional cost resulting from the selection of Alternative 6 rather than Alternative 4 is outweighed as a result of the consideration of the other eight criteria that must be evaluated by EPA in selecting the appropriate remedy. In addition, EPA believes that the site's location in Holden will lend it to a variety of future uses. In comparing Alternative 4 to Alternative 6, the location of the proposed cap in Alternative 4 would severely limit the potential future use of the site. Alternative 6 will allow for a greater variety of future uses of the site, an important factor considering the location of the site in Holden.

10. <u>Comment</u>:

> "Alternatives 4 and 6 achieve the same level of risk reduction, <u>i.e.</u>, both reduce risks below the 10^{-6} level ...;"

<u>EPA's Response</u>:

Alternative 4 may achieve the same level of risk reduction as Alternative 6 once the cap is in place and as long as the cap included under Alternative 4 remains intact. However, the uncertainty of the future maintenance of the cap leaves doubt concerning the long-term level of protectiveness. Also, <u>see</u> EPA's response to comment 17.

11. <u>Comment</u>:

"Alternatives 4 and 6 are equally effective in the long-term; although caps can pose some threat of remedy failure where groundwater is a concern, there is no such threat here, where the pathways of concern are direct contact with soils or building structures, not groundwater;"

<u>EPA's Response</u>:

There is very little uncertainty with respect to the long-term effectiveness of Alternative 6. The long-term effectiveness of Alternative 4 is wholly dependent upon the integrity of the cap. For long-term protectiveness, a higher degree of certainty is achieved with Alternative 6 with the reduction of intervening actions required to assure the continued effectiveness of the remedy. Also, <u>see</u> EPA's response to comment 19.

12. <u>Comment</u>:

"Alternative 4 is superior to Alternative 6 because it is more effective in the short-term ...;"

<u>EPA's Response</u>:

Due to the activities anticipated in the implementation of Alternative 6, the short-term effects are not anticipated to represent a significant threat. With the exception of removal of concrete building slabs, the activities that would take place under Alternative 6 that would not take place under Alternative 4 are identical to activities that have already been performed at the site with no known adverse effects. Stringent requirements would be necessary to keep the short-term effects of the concrete removal to a negligible impact, but it is not beyond current practices to do so. The time for implementation for Alternative 6 could be longer than for Alternative 4 (15 to 24 months vs. 12 to 24 months), but the impact on public health should be negligible. Also, <u>see</u> EPA's response to comment 21.

13. <u>Comment</u>:

"Alternative 4 costs half of what Alternative 6 costs ..."

EPA's Response:

According to the estimates provided in the FS, the present worth cost to implement Alternative 4 with the offsite landfill option is $6,103,745, compared to the present worth cost of $12,558,238 for Alternative 6 with the offsite landfill disposal option.

14. Comment:

"Region VII's apparent belief that it must add an incineration or treatment component to the proposed remedy (despite the fact that such treatment is unnecessary from a risk-reduction standpoint) is simply wrong. Region VII's reasons for requiring incineration are erroneous because:

(1) Contrary to CERCLA's language and the statute's intent, Region VII transforms CERCLA's preference for treatment into a mechanical requirement that treatment must always be performed;

(2) Region VII ignores EPA policy that site cleanups are to be evaluated as a whole and refuses to recognize that 9.4 million pounds of material, or 99% of the PCBs at the Site, have already been removed and incinerated, thereby satisfying CERCLA's treatment preference; and

(3) Region VII applies to the offsite disposal of Rose materials a document which has no legal force and which is designed only for material left onsite."

EPA's Response:

Contrary to the commentator's assertion. the Region does not believe it must automatically add a treatment component to the proposed remedy (emphasis added). However, statutory and regulatory requirements indicate the preference for treatment must be considered in selecting the final remedial action at the site.

(1) EPA views CERCLA's preference for treatment as just that, a preference, and not a requirement that treatment must always be performed. In developing remedial alternatives that involve treatment, EPA generally will consider the following factors set forth in the National Contingency Plan at 40 C.F.R. § 300.430(a)(iii), which states:

"(A) EPA expects to use treatment to address the principal threats posed by a site, whenever practicable. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials.

(B) EPA expects to use engineering controls, such as containment, for waste that poses a relatively low long-term threat or where treatment is impracticable.

(C) EPA expects to use a combination of methods, as appropriate, to achieve protection of human health and the environment. In appropriate site situations, treatment of the principal threats posed by a site, with priority placed on treating waste that is liquid, highly toxic or highly mobile, will be combined with engineering controls (such as containment) and institutional controls, as appropriate, for treatment residuals and untreated waste. ..."

EPA's selection of the treatment of the principal threats at the site is not inconsistent with the NCP, nor is it the result of an interpretation that all sites require treatment.

(2) Prior action at the site under two Administrative Orders with the RCSC has resulted in the treatment by incineration of approximately 11.1 million of the 21.1 million pounds of contaminated material removed from the site. However, EPA does not agree that the past actions necessarily satisfy CERCLA's preference for treatment, especially when highly contaminated materials remain onsite. EPA concurs that a substantial amount of highly contaminated materials have been removed from the site and treated; however, there remain onsite materials which are also highly contaminated which should also be treated. Approximately 21.1 million pounds of contaminated material have been removed from the site with 11.1 million pounds of that material, or 53 percent being incinerated. Of the approximately 25 million pounds of contaminated material that remain onsite, EPA proposes to treat only 8 percent of that remaining material. That would bring the total of treated contaminated material to approximately 13.1 million pounds, or 50 percent of all material remediated at the site. The RI/FS addressed the 25 million pounds of material that now remain at the site. The selection of the remedy is intended to address the threats at the site.

(3) This statement is apparently made in reference to use of the publication "Guidance on Remedial Actions for Superfund Sites With PCB Contamination" EPA/540/G-90-007, August 1990. This document was developed by EPA as a guide for the Regions in developing nationally consistent remedial actions for sites that involve PCB contamination and is intended to apply to

contaminated materials removed from Superfund PCB sites as well as sites where PCB-contaminated material is treated onsite. Also, see EPA's responses to comments 25 and 26.

15. Comment:

"... requiring incineration of any of the remaining materials ... will increase the potential for future CERCLA liability to those who undertake the proposed remedy. In addition to the TSCA landfill which would ultimately receive the materials for disposal, one would incur potential future CERCLA liability at the treatment facility itself. As a practical matter, one can hardly justify or be expected to assume the significant additional expense of incineration where it will result in no meaningful benefit at the Site but will instead increase substantially the potential for future CERCLA liability."

EPA's Response:

As has already been stated, several million pounds of PCBs have already been incinerated and the future incineration of the remaining highly contaminated materials at the site should not result in any significant increase in potential liability, if the same treatment facility is utilized to implement the proposed remedy. In addition, the incineration process reduces the materials to non-hazardous levels, and therefore incinerated residue could be disposed of in a solid waste landfill. Even if the incineration residue were sent to the TSCA landfill, no significant increase in potential liability should occur because significant amounts of materials have previously been sent to the TSCA landfill pursuant to the second AOC and other contaminated materials would be sent to the TSCA landfill under each of the alternatives.

16. Comment:

"Measured against the criteria set forth in the NCP, Region VII's Proposed Remedy is not any more protective of human health and the environment, nor more effective or permanent over the short- or long-term than alternatives involving capping.[1] Of course, Region VII makes no such claim in the Proposed Plan. Instead, Region VII, without explanation, selects Alternative 6 as the "basic component" of the Proposed Remedy. As the FS Report concluded, however, capping alternatives achieve the same level of protection as Alternative 6, and can be implemented in a manner that reduces short-term risks and at far less cost than the Proposed Remedy."

Comments 17 through 23, following, expand upon this comment in terms of seven of the nine criteria that EPA must consider in selecting a remedy.

EPA's RESPONSE:

EPA's responses to comments 10-13, 17, 19, 21 and 23 are responsive to this comment. The responses address relevant factors, including: short-term and long-term effectiveness, future use of the site, cost, as well as protectiveness. The commentator believes the capping alternatives are a more logical choice based on an evaluation of four of the nine criteria: 1) overall protection of human health and the environment; 2) long-term effectiveness and permanence; 3) short-term effectiveness; and 4) cost. However, EPA's selection of Alternative 6 as the basic component of the proposed remedy is based upon its evaluation of all nine criteria, the four cited by the commentator, plus: 1) compliance with ARARs and TBCs; 2) reduction in toxicity, mobility and volume of contaminants through treatment; 3) implementability; 4) state acceptance; and 5) community acceptance.

17. Comment:

"a. Overall Protection of Human Health and the Environment. ... The FS Report concluded that the capping alternatives will achieve the same degree of overall protection of human health and the environment as Alternative 6, and Region VII's Proposed Plan confirms this conclusion."

"... Notably, Region VII and the Missouri Department of Natural Resources have concluded that groundwater pathways do not present any actual health risk at the Site."

"The capping alternatives thoroughly address the health risk concerns identified by the FS Report and Region VII. ..."

"Risk associated with contaminated building structures are reduced or eliminated under the capping alternatives. ... Risks associated with building structures are eliminated altogether under Alternative 4, where building structures are removed leaving only the concrete slabs intact. The concrete slabs are covered by the cap. ... Alternative 4 is equivalent to Alternative 6 in reaching remedial action objectives. ..."

EPA'S Response:

The FS Report, prepared by the RCSC, concludes that Alternative 4 will achieve the same degree of overall protection as Alternative 6. EPA has concluded that Alternative 4 may achieve the same level of protectiveness if the maintenance of the cap could be assured.

Overall protection of human health and the environment is one of the nine criteria and addresses whether a remedy provides adequate protection to human health and the environment and is concerned with how risks through each pathway are eliminated, reduced or controlled. The capping alternatives and Alternative 6 all control the risks. Whereas the capping alternatives control the risks posed by the various media through capping and/or encapsulation, Alternative 6 eliminates the risks posed by each pathway by removing the contaminated materials from the site. All other factors being equal, Region VII believes it is better to eliminate, rather than control, the risks at a site. EPA does not believe that the two options inherently represent the same level of protection.

EPA has concluded that if no migration could be assured and the cap remains in place, the capping of the site would address the risks associated with the site. There is no assurance that there will be no migration, nor can it be assured that the cap will not be breached. While Region VII has concluded that ground water pathways do not present any current actual health risk, the contamination in the shallow ground water could pose potential health risks if recontamination of the unnamed tributary occurs through recharge from the shallow ground water.

Additionally, the large portion of the site to be capped would require institutional controls unduly restricting the future use of the site. In the event the cap fails, the potential for the recontamination of the areas previously remediated exists, along with the potential exposure to the highly contaminated material that Alternative 4 would leave onsite.

18. Comment:

"b. Compliance With ARARs. ... Virtually all of the alternatives discussed in the FS Report would comply with ARARs and TBCs. Region VII, nevertheless, apparently believes that the Guidance Document is a TBC which mandates further incineration of PCB-contaminated materials at the Site. ... Region VII simply is mistaken in concluding that the Guidance Document is relevant at the Site. Foremost, the Guidance Document, by its terms, relates to situations where PCBs at or above certain levels could or are intended to remain at the Site. ... The materials that Region VII says will require treatment are not those that would remain at the Site under Alternative 6 and thus PCB concentration levels triggering the Guidance Document's recommendations will not exist at the Site. ... Moreover, the Guidance Document indicates that containment is an appropriate method of addressing soils contaminated over certain levels. Incineration is not required by the EPA's guidance. More important, the Guidance Document does not even address concrete. ..."

<u>EPA's Response</u>:

EPA has determined that the subject Guidance Document is a TBC which should be considered in selecting the remedial action for the site. Also, <u>see</u> EPA's responses to comments 14(3), 25 and 26.

19. <u>Comment</u>:

"c. <u>Long-term Effectiveness and Permanence</u>. The Proposed Remedy and the capping alternatives provide essentially the same degree of long-term effectiveness and permanence. ..."

"Moreover, adding an incineration component to Alternative 6 does not render Alternative 6 any more effective or permanent than without incineration. ..."

<u>EPA's Response</u>:

An element of long-term effectiveness and permanence includes the ability of a remedy to maintain reliable protection of human health and the environment over time. For the Rose site, capping a portion of the site under any of the capping alternatives does not achieve the same degree of long-term effectiveness and permanence that removal of contaminated material would achieve under Alternative 6 because of the uncertainty in maintaining a cap over a substantially long period of time.

20. <u>Comment</u>:

"d. <u>Reduction of Toxicity, Mobility or Volume Through Treatment</u>. The EPA has indicated that this criterion is included in the NCP to "address[] the statutory preference for selecting remedial actions that employ treatment technologies that permanently reduce the toxicity, mobility or volume of the hazardous substances as a principal element." 55 Fed. Reg. at 8720-21. As is stated later in these comments, this criterion has already been satisfied at the Site as a result of the incineration of 9.4 million pounds of PCBs, PCB-contaminated material, and other hazardous substances pursuant to the administrative orders."

EPA's Response:

EPA recognizes that a significant amount of PCBs and PCB-contaminated wastes have previously been treated through incineration. However, this fact does not mean the subject criterion has been satisfied and that treatment technologies should not be considered for the remaining contaminated materials at the site. Also, see EPA's response to comment 14.

21. Comment:

"e. Short-term Effectiveness. While it adds no discernable long-term benefit to the overall remediation of the Site, the Proposed Remedy adds notable, quantifiable risks to identified populations over the short-term. As such, the net effect of the Proposed Remedy, in very real terms, is the selection of an overall clean-up program that is less protective and less effective at reducing risks that one that avoids excavation, removal and incineration of soils and concrete. The Proposed Remedy will result in a dramatic increase in risk exposure to workers. Cutting, excavation and removal activities (including segregating and sampling of concrete that would be necessary by the incineration component of the Proposed Remedy), by necessity, will increase potential exposure to workers and will result in greater potential for particulate emissions during the cutting process.

The incineration component of the Proposed Remedy will increase short-term risks even further. In addition to the increased worker exposure during the extra on-site activities required by incineration, increased travel times and distances required by delivery to an off-site incinerator measurably increase short-term exposure risks. Transportation risks can be quantified, based on the expected numbers of loads and travel distances required, and on data developed by the U.S. Department of Transportation. The risks of accident, injury and fatalities will be substantially higher if material must first be transported to an incinerator and then sent to a TSCA landfill. Of course, no transportation is required under Alternative 4. Moreover, incineration is a dynamic process with many inherent risks. Factors such as incinerator shutdown based on pollution control equipment failure, improper feeds or combustion parameter exceedances would all increase risks associated with incineration. While such risks may be difficult to quantify they are nonetheless real."

EPA's Response:

As stated in previous responses, EPA believes that removal of the contamination from the site under Alternative 6 provides a greater degree of long-term effectiveness and permanence. Although a small unquantified increase in short-term risk may exist to workers onsite, this risk does not represent any real hazard. Any potential increased risk would be eliminated by use of personal protective equipment to prevent actual exposure. Similar precautions to those which were taken during the previous removals would be required, eliminating the potential for actual exposure. Stringent requirements on particulate emissions during the implementation of Alternative 6 would be required to ensure that fugitive dust emissions would not be a source of a hazard to onsite workers during all phases of the remedial action.

In the abstract, transportation of the material to a landfill or incinerator would result in a certain amount of transportation related risk. To date, over 20 million pounds of PCB material have been removed from the Rose site without one instance of a spill or other release resulting in public exposure. Both the capping alternatives and Alternative 6 involve the transportation of contaminated materials from the site. Based upon prior experience, EPA believes that any additional risk which may exist as a result of transporting contaminated materials under Alternative 6 is negligible. The incinerated residue from any incinerator could be treated as non-hazardous and could be disposed of in a solid waste landfill.

The comment does not quantify the risks it associates with the incineration process. Any of the factors resulting in shutdown would be the result of safety equipment features which were insuring the safe and proper operation of the incinerator. EPA believes the remotely potential occurrences identified in the comment do not constitute any real risk. There may be some very slight risk associated with releases which could occur prior to the shutdown of an incinerator in one of the instances identified, but these risks would be extremely small, since safeguards have been established at the incinerators to insure shutdown takes place prior to significant releases.

22. <u>Comment</u>:

> "f. <u>Implementability</u>. In terms of their implementability, the Proposed Remedy and the capping alternatives are essentially the same except in one significant respect - the Proposed Remedy will take a longer time to implement. ..."

<u>EPA's Response</u>:

The commentator's estimates in the 'Detailed Statement' that each of the capping alternatives could be implemented in 12 to 24 months. The commentator also states that the FS estimated the offsite incineration time for all the remaining 25 million pounds of contaminated materials at the site under Alternative 6 to be 154 months. The FS time estimate of 154 months allows for the incineration of 162,337.66 pounds of material per month or approximately 81 tons per month. However, implementation of the proposed remedy would not require incineration of all 25 million pounds of contaminated material. The proposed remedy calls for the incineration of only approximately 2 million pounds total, or some 1000 tons total. At the FS estimated destruction rate of 81 tons per month, it would take about 12 and a half months under the proposed remedy to incinerate the contaminated material. The time to accomplish the other work at the site under the proposed remedy, assuming none of it could be done at the same time, would be approximately 12 months. The estimate of time to complete the proposed remedy then becomes a maximum of 24 and a half months as compared to the 154 months estimated in the FS for Alternative 6-offsite incineration. EPA believes that the material to be incinerated could be incinerated at a rate greater than 81 tons per month and that portions of the other work to be accomplished at the site could be done at the same time thereby significantly reducing the maximum 24 and a half months estimate. EPA believes that there is no significant difference between the implementation time between Alternatives 4 and 6.

23. <u>Comment</u>:

> "g. <u>Cost</u>. Assuming the cost estimate prepared by Region VII is accurate, the Proposed Remedy will cost more than $13.6 million. By contrast, the cost estimates for the capping alternatives range from $3.6 million to $8.8 million. Alternative 4 is estimated to cost $6.1 million. ..."

<u>EPA's Response</u>:

Although cost is a consideration, it is not the only factor that is considered by EPA in selecting a remedy. Cost is one of the nine criteria that EPA must consider in selecting a remedy. In selecting the preferred remedy, EPA considered each alternative in light of the nine criteria, including cost. The additional 10 percent increase in cost to incinerate the highly contaminated materials remaining at the site rather than landfilling all the contaminated material is not the only factor to be considered in selecting the final remedy. The additional cost involved in incinerating contaminated materials under the preferred remedy has been considered in conjunction with the requirements of CERCLA and the NCP.

24. Comment:

"...The RCSC understands, however, that the City of Holden has or will object to the Proposed Remedy because, in the City's view, the Proposed Remedy will take much longer to implement than alternatives not involving incineration."

EPA's Response:

This comment was provided in conjunction with comment 16, above, to provide the commentator's view of what the 'community acceptance' criteria would be. Contrary to this comment, City of Holden officials have in fact supported the proposed remedy (see comment 8), indicating the City's preference that all contaminated materials be removed from the site, recognizing that some "hot spots" may require incineration.

25. Comment:

"The Preference For Treatment Does Not Require Further Incineration At This Superfund Site. ... Section 121(b) does not require that the EPA select remedies that utilize treatment."

"... The legislative history of Section 121 counsels against the selection of "foolish, costly remedies" where alternative cost-effective remedies are equally protective:

> This does not require the selection of the "most permanent" remedy available; it is not intended that EPA spend millions of dollars incinerating vast amounts of slightly contaminated materials where other cost-effective alternatives would provide a high degree of permanence and protection of public health and the environment. ... 132 Cong. Rec. H9567 ..."

"... Requiring "some treatment" as part of the Proposed Remedy ignores that at this Superfund site the principal threats have already been addressed through treatment. ... the Proposed Plan calls for the incineration of an estimated 25 million more pounds of soil and concrete to destroy less than eight-tenths of one percent of the PCBs."

"Requiring more incineration to satisfy the treatment "requirement" means Region VII views initial response actions as completely separate environmental clean-up activities that occur at a given site. ..."

<u>EPA's Response</u>:

Region VII does not view the "Preference for Treatment" as being a mandate which requires every remedy to contain treatment. The Region does view this preference as appropriate when treatment is reasonably available to address the principal threats in light of all circumstances and factors, consistent with Agency policies and guidances.

Previous action at the site has resulted in the removal and treatment by incineration of significant amounts of PCB-contaminated wastes. Contrary to the commentator's assertion, all principal threats at the site have not been addressed. EPA guidance defines principal threats at non-restricted/residential sites, such as the Rose site, as being soils and debris with greater than 100 parts per million PCB contamination. It is those materials which the Region has proposed to treat, while recognizing the significant costs associated with the treatment of concrete.

The commentator states that the Proposed Plan calls for the incineration of 25 million pounds of material. The Proposed Plan calls for the treatment of only 8 percent of the 25 million pounds which remain at the site, or approximately 2 million pounds. While only treating 8 percent of the remaining waste at the site, the proposed remedy will treat over 80 percent of the PCBs remaining at the Rose site.

26. <u>Comment</u>:

"<u>The Guidance Document Is Inapplicable And Warrants No Consideration</u>. First, and foremost, the Guidance Document is not legally compelling. ..."

"Reliance on the Guidance Document to justify a proposed remedy that requires incineration as part of Alternative 6 is completely flawed. The only concern in the Guidance Document is contamination levels left at Superfund sites; once the decision is made to remove contaminated materials, the terms of the Guidance Document are irrelevant. ..."

"... Nevertheless, Region VII's past and continuing failures to understand and interpret properly EPA guidance and requirements necessitates some specific references (with emphasis added):

> In particular, the expectation that principal threats <u>at the site</u> should be treated, whenever practicable, and that consideration should be given to containment of low threat material, forms the basis for assembling alternatives. Principal threats will generally include material contaminated at concentrations exceeding 100 ppm <u>for sites</u> in residential areas and concentrations exceeding 500 ppm <u>for sites</u> in industrial areas (Guidance Document iv, hereafter e.g., "G.D.iv".)
>
> Containment of waste that poses a low, long-term threat or where treatment is impracticable,... Remedies that combine treatment of principal threats with <u>containment</u> and institutional control for treatment residuals and untreated waste (G.D.5)
>
> 1. Identify remedial action response objectives including the preliminary remediation goals but define the appropriate concentrations of PCBs that could <u>remain at the site</u> without management controls.
> 2. Identify general response actions such as excavation and treatment, containment, or in-situ treatment. (Id.)
>
> Determination of the appropriate concentration of PCBs that can remain <u>at a site</u> (remediation goal) under various site-use assumptions. (G.D.6)
>
> The concentration of PCBs in the soil above which some action should be considered (i.e., treatment or containment) will depend primarily on the exposure estimated in the baseline risk assessment based on current and potential future land use. (G.D.27)
>
> The concentration that defines the area over which some action must be taken is the concentration of PCBs that can protectively be <u>left on-site</u> without management controls (G.D.28)

As described in Section 1, one of the Superfund expectations is that principal threats at a site will be treated whenever practicable and that low-threat materials will be contained and managed (G.D.39)

In some cases it may be appropriate to treat material contaminated at concentrations lower than what would otherwise define the principal threats because it is cost-effective considering the cost of treatment versus the cost of containment, because the site is located in a sensitive area... In other cases, it may be appropriate to contain the principal threats as well as the low-threat material because there are large volumes of contaminated material... (G.D.40)

Each of these provisions (and, indeed, many other) in the Guidance Document illustrates that the Guidance Document is only concerned with action levels and actions taken pertaining to PCB-contaminated materials that will be left at the Superfund site. Once those materials are, as an alternative, removed from the site, the Guidance Document is no longer relevant as to how they are handled. ..."

EPA's Response:

As previously stated in EPA's response to comment 14(3), the guidance document referenced is generally applicable to all actions at Superfund sites with PCB contamination, not only those where onsite containment or treatment is the only remedy to be used.

The Agency's position with respect to the applicability of the subject guidance document is that the guidance document was intended to address all Superfund sites with PCB contamination and that it recommended the treatment of principal threats, regardless if they were taken offsite or treated onsite.

27. Comment:

"Continued Groundwater Monitoring, As Part of the Proposed Remedy, Is Unwarranted and Unnecessary. The Proposed Remedy's inclusion of continued groundwater monitoring as a component of a remedy that proposes excavation and removal of soils and concrete contaminated above 10 ppm is unwarranted. ..."

EPA's Response:

The FS included ground water monitoring in each of its alternatives, with the exception of the no action alternative, Alternative 1. EPA concurred that such monitoring was an essential element of the remedy since there is a potential for contaminants to migrate from the shallow ground water to either the deeper ground water or, more importantly, to nearby surface waters. The RI determined that contamination existed in the shallow ground water. EPA has determined that ground water monitoring is an important element to ensure the proper effectiveness of the remedial action. Ground water monitoring will serve as an early warning that site conditions have changed or unknown factors have arisen or to assure all involved that the remedy has preformed as expected.

SUMMARY:

The Proposed Plan is the preferred remedy for the Martha C. Rose Chemicals Site based upon the following criteria:

Long-term effectiveness:

With minor modifications, Alternative 6 (the preferred remedy in the Proposed Plan) provides the greatest long-term effectiveness with the least intervention by man. The other alternatives include capping options, which would require cap maintenance as well as deed restrictions that would unnecessarily limit the future use of the site.

Short-term effectiveness:

While the short-term effectiveness of the preferred remedy may be somewhat less than Alternatives 1 through 5, actions to mitigate the potential risk of short-term exposures are relatively easy to implement and mitigation should be easily achieved.

Reduction of toxicity, mobility, or volume through treatment:

The preferred remedy does provide some reduction of toxicity through treatment. It should also be noted that a volume reduction of hazardous materials would be achieved through treatment, since once incinerated the incinerator residue may be delisted and treated as non-hazardous, and thereby not requiring final disposal in a TSCA landfill.

Implementability:

The preferred remedy will not take significantly more time to implement than the other alternatives, and in all probability will take the same amount of time.

Cost:

The preferred remedy would cost an estimated $13,600,000, or 10 percent more than the Alternative 6 that was presented in the FS.

State acceptance:

The State of Missouri has not objected to the Proposed Plan and has been involved with its development. The State has indicated its preference that all contaminated materials be removed from the site.

Community acceptance:

The City of Holden supports the Proposed Plan and has stated the City's desire that all contaminated material be removed from the site.